

AD A070732

AMRL-TR-79-28



REVISED HEIGHT/WEIGHT SIZING PROGRAMS FOR MEN'S PROTECTIVE FLIGHT GARMENTS

MILTON ALEXANDER

AEROSPACE MEDICAL RESEARCH LABORATORY

JOHN T. McCONVILLE

ILSE TEBBETTS

ANTHROPOLOGY RESEARCH PROJECT, INC.

503 XENIA AVENUE

YELLOW SPRINGS, OHIO 45387

April 1979

Approved for public release; distribution unlimited.

AEROSPACE MEDICAL RESEARCH LABORATORY
AEROSPACE MEDICAL DIVISION
AIR FORCE SYSTEMS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

20040507012

BEST AVAILABLE COPY

NOTICES

When US Government drawings, specifications, or other data are used for any purpose other than a definitely related Government procurement operation, the Government thereby incurs no responsibility nor any obligation whatsoever, and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise, as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

Please do not request copies of this report from Aerospace Medical Research Laboratory. Additional copies may be purchased from:

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Federal Government agencies and their contractors registered with Defense Documentation Center should direct requests for copies of this report to:

Defense Documentation Center
Cameron Station
Alexandria, Virginia 22314

TECHNICAL REVIEW AND APPROVAL

AMRL-TR-79-28

This report has been reviewed by the Information Office (OI) and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.

FOR THE COMMANDER



CHARLES BATES, JR.
Chief
Human Engineering Division
Aerospace Medical Research Laboratory

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AMRL-TR-79-28	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) REVISED HEIGHT/WEIGHT SIZING PROGRAMS FOR MEN'S PROTECTIVE FLIGHT GARMENTS		5. TYPE OF REPORT & PERIOD COVERED Technical Report
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Milton Alexander * John T. McConville Ilse Tebbetts		8. CONTRACT OR GRANT NUMBER(s) F33615-78-C-0508
9. PERFORMING ORGANIZATION NAME AND ADDRESS Anthropology Research Project, Inc. 503 Xenia Ave. Yellow Springs, Ohio 45387		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 62202F, 7184-08-26
11. CONTROLLING OFFICE NAME AND ADDRESS Aerospace Medical Research Laboratory Aerospace Medical Division, AFSC Wright-Patterson AFB, Ohio 45433		12. REPORT DATE April 1979
		13. NUMBER OF PAGES 117
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES * Crew Station Integration Branch Human Engineering Division Aerospace Medical Research Laboratory Wright-Patterson AFB, Ohio 45433		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
Height/weight sizing programs	Dimensional data	Protective clothing
Sizing tables	Summary statistics	USAF men
Design values	Percentiles	
Size categories	Tariffs	
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Presented in this report is an updated series of height/weight sizing programs for use by designers of protective clothing for USAF men. The sizing values are based on an analysis of data obtained in the 1967 survey of flying personnel and cover some 71 dimensions (excluding head, hand and foot measurements). Sizing tables containing specific data from which design values can be obtained are given for four-, six-, eight-, and twelve-size programs.		

20. ABSTRACT (cont'd)

Accompanying these working data are: bivariate tables which graphically illustrate how the sizing programs were arrived at; summary statistics and selected percentile data for each variable; and tariffs suggesting the number of garments to be procured for each size.

Supporting text, designed to give the reader some background and guidance in the use of this material, includes a step-by-step explanation of how sizing programs are developed, an explanation of statistical terms and procedures, and some guidelines for selection of the sizing program appropriate for a given garment.

This report is designed to update an earlier series of height/weight programs based on a flying population surveyed in 1950. A companion document containing height/weight programs for women fliers is currently in production.

PREFACE

This report was prepared to fulfill requirements of contract F33615-78-C-0508 with the Aerospace Medical Research Laboratory (AMRL) at Wright-Patterson Air Force Base, Ohio. Contract monitor was Mr. Charles Clauser of Crew Station Integration Branch, Human Engineering Division.

The illustrations which add considerable clarity to the text were originally executed by Ms. Kay Downing and graphically enhanced by Mr. Ron Robinette.

Mr. Paul Kikta and Mr. Glen Potter of the University of Dayton Research Institute patiently ran, modified and re-ran computer programs to produce the sizing programs and bivariate tables which form the central core of this presentation.

Credit for the typing, layout and final production goes to Ms. Jane Reese of the Anthropology Research Project.

The authors are grateful, also, to Mr. Clauser and to Dr. Mel Warrick of AMRL for their knowledgeable and thorough reviews of the manuscript.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
I INTRODUCTION.	4
II THE DEVELOPMENT OF AN ANTHROPOMETRIC SIZING PROGRAM	6
Step One (sample selection).....	6
Step Two (sizing dimension selections)..	6
Step Three (size interval selections)...	7
Step Four (development of dimensional data for size categories)....	8
Step Five (conversion of statistical data to design values).....	10
Step Six (establishment of tariffs).....	12
III EXPLANATION OF STATISTICAL TERMS.	13
The Mean.....	13
The Standard Deviation.....	13
The Coefficient of Variation.....	14
The Percentiles.....	14
Bivariate Frequency Tables.....	14
IV THE HEIGHT/WEIGHT SIZING DATA	16
Visual Index.....	27-37
Sizing Tables.....	38-106
V SELECTION OF THE APPROPRIATE SIZING PROGRAM . . .	107
APPENDIX: Definition of Terms.	110
BIBLIOGRAPHY.	113
REFERENCES.	113

LIST OF ILLUSTRATIONS

<u>Figure</u>		
1	Height/weight bivariate distribution table for eight-size height/weight program.....	9
2	Areas under the normal curve.....	11

LIST OF ILLUSTRATIONS (CONT'D)

<u>Figure</u>		<u>Page</u>
3	Height, as measured in the 1967 survey of USAF fliers.....	17
4	Weight, as measured in the 1967 survey of USAF fliers.....	17

LIST OF TABLES

<u>No.</u>		
1	Bivariate Distribution Illustrating Four-Size Height/Weight Program.....	19
2	Size Categories and Tariff for Four-Size Height/ Weight Program.....	20
3	Bivariate Distribution Illustrating Six-Size Height/Weight Program.....	21
4	Size Categories and Tariff for Six-Size Height/ Weight Program.....	22
5	Bivariate Distribution Illustrating Eight-Size Height/Weight Program.....	23
6	Size Categories and Tariff for Eight-Size Height/ Weight Program.....	24
7	Bivariate Distribution Illustrating Twelve-Size Height/Weight Program.....	25
8	Size Categories and Tariff for Twelve-Size Height/ Weight Program.....	26

SECTION I

INTRODUCTION

Of all the body measurements with which anthropometrists, human engineers and designers have been concerned, singly and in combination, height and weight are perhaps the most influential. Statistically they have the advantage of correlating well with a large number of other body dimensions central to most design problems, while practically their merit lies in being easily obtainable on a large scale.

In 1959, Emanuel et al. developed a series of height/weight sizing programs for flight clothing based on an analysis of body size data obtained from a 1950 survey of USAF flying personnel (Hertzberg et al., 1954). Practical applications over the past 20 years have demonstrated the validity of this approach.

If the concept is a proven one, the passage of time with its changes in personnel and military systems brings with it the need for new data and modified sizing programs.

In this report, a new series of height/weight sizing programs is developed from the analysis of data obtained from a 1967 survey of USAF fliers. In updating this sizing system, we took the opportunity to conduct a comparable analysis of female data and Height/Weight Sizing Programs for Women's Protective Garments (in preparation) serves as a companion volume containing sizing systems devised for the design of personal-protective clothing for USAF women. While a combined sizing system was originally considered, a study of the dimensional data for men and women suggests that such an amalgamation should be attempted only with specific garments in mind. For the purposes of a general sizing program, the significant proportional differences between the sexes cannot be reconciled by an assumption that women, in general, simply require smaller scaled sizes of the same garments worn by men (Zimmerle et al., 1979).*

Presented in this report are four-, six-, eight- and twelve-size systems which replace the six-, eight-, twelve- and twenty-size systems outlined in the earlier report. The 1959 report covered 55 variables; 71 dimensions are given in this report. The lists of variables are, in large part, overlapping with the additions chiefly accounted for by the inclusion of a

* Zimmerle, Kathleen, Thomas Churchill and John T. McConville. A Comparison of Male and Female Body Sizes and Proportions. In Press.

half-dozen torso segment measurements and the addition of five height dimensions.

The 1967 survey sample (Churchill et al., 1977), on which the data in this analysis are based, was composed of 2420 men all of whom were officers on active flying status. Rated pilots made up 49% of the sample, rated navigators 21%, student pilots 21% and student navigators 8%. A few flight surgeons completed the sample. Ninety-eight percent of the subjects were White. Their ages ranged from an average of about 23 years old for student fliers to 32 years old for rated pilots and navigators.

By comparison the 1950 population numbered 4063 subjects and included a number of enlisted men (24%). Mean ages of the various groups, which included aviation cadets, were more homogeneous ranging from 26.4 years to 30.7 years. Like their successors, the 1950 population was predominantly White.

In terms of body size, the more recent flying population was shown to be, on the average, about 3/4 inch taller and some 10 pounds heavier than the 1950 sample. This difference holds true, not only for those men in the middle of the body size range but also for the largest and smallest subjects at the upper and lower ends of the distribution.

While the sizing tables containing specific data from which design values can be obtained are the central feature of this report, supporting chapters serve as guidelines for the designer in understanding, applying and selecting the data best suited to his or her needs. These include a brief explanation of how sizing programs are developed, an explanation of statistical terms and procedures used in this report, illustrated descriptions of each variable measured, and a concluding chapter suggesting criteria by which the designer can select from among the alternative sizing systems. A glossary of measurement terms appears in the Appendix.

SECTION II

THE DEVELOPMENT OF AN ANTHROPOMETRIC SIZING PROGRAM

An anthropometric sizing analysis for clothing and personal-protective equipment is based on the concept of dividing the population into subgroups of individuals who are more or less similar in certain relevant body size dimensions (e.g. tall and slender, short and heavy) and then analyzing the anthropometric data for these subgroups to arrive at appropriate dimensional design values which will accommodate the size variability within each group.

Specifically, the sequence of steps involved is: (1) selection of an appropriate body of data for analysis, (2) selection of the key or sizing dimensions, (3) selection of intervals for the key dimensions that will establish each size category, (4) development of the dimensional data for each of the established size categories, (5) conversion of the summary statistical data to the appropriate design values, and (6) establishment of the tariff or numbers of each size necessary to outfit the user population.

STEP ONE

The rationale for selecting the 1967 survey of USAF flying personnel as the basis for this sizing analysis is self-evident. The 1967 survey represents the most recent large body of data available on USAF aircrewmembers.

STEP TWO

The choice of key or sizing dimensions is of crucial importance but is seldom, if ever, clear cut. These dimensions should be conveniently measurable and have a high degree of correlation with other dimensions which are of importance in the design and sizing of the end item. In fact, no single body measurement or dimension is adequate as a basis for sizing most items of clothing or personal-protective equipment because no single dimension is closely related both to the lengths or heights of the body and to its girths, breadths and depths. For example, waist measurements alone are inadequate to obtain a good fit in trousers since men of comparable waist girth vary so widely in leg length.

The obvious solution is to choose two or more key dimensions selected so that each will control some different aspect of body size variability such as linearity or mass. The next problem is to determine which pair should be used in a particular sizing program. The selection often depends on which ones exercise maximum control over other dimensions of body size which are relevant in the design. By "control" we mean the degree to which changes

in a given dimension correlate with changes in another dimension. The statistic used to measure this relationship is the correlation coefficient--the higher the relationship, the closer the correlation coefficient ("r") approaches 1.0. If little or no relationship exists between two dimensions, then the correlation coefficient will approach 0.00.

It should be clear from the foregoing discussion that pairs of key dimensions need not correlate well with each other but that each key dimension should correlate well with other related dimensions. Thus, for example, height which controls other height measurements such as leg length and waist height, and weight which correlates well with other measurements of girth and breadth, typically have but moderate relationship with each other (r is approximately equal to .500).

In selecting the key dimensions, an evaluation of the inter-relationships of all the dimensions involved in the design of the garment is made. The results of such an evaluation conducted by Emanuel et al. (1959) showed that height and weight were the optimum combination of key dimensions for one-piece flight garments. This finding, based on multiple correlation coefficients, corroborated similar findings from previous studies (O'Brien and Shelton, 1941, O'Brien et al., 1941, and Morant and Gilson, 1945).

In addition to its statistical virtues, a height/weight system has numerous practical advantages. Fitting in the field is simplified since these two measurements are generally known to persons being fitted and can, in any case, be easily measured. Distribution to field units and spot checks on USAF needs can be made by reference to records of yearly USAF physical examinations during which height and weight are ascertained. Further, because height and weight are not directly built into the design of the garment, there is overlap between sizes for all design dimensions. This results in greater flexibility in accommodating the subject population since it allows for more upgrading and downgrading of sizes than would be possible if key sizing dimensions were incorporated directly into the garment design.

STEP THREE

Step three calls for the establishment of size intervals. The width of the size interval of the key dimension(s) dictates not only the size variation for that dimension but for all the other design dimensions that are highly correlated with it as well. Thus, in the small-medium-large system often used to categorize inexpensive clothing, there is a very high degree of body size variability to be found among persons in each group. A "medium" sized shirt might be the garment of choice for a short man with a relatively heavy torso, a man whose height and chest circumference approach the mean for U.S. men, or a large man with a narrow torso. Obviously there will be a good deal less variation among men in each group if a six- or eight-size system is used.

While a surprisingly large number of men can be successfully fitted in upper-torso garments by a limited-size program, it is clear that more sizes will fit more men better. On the other hand, it has been found that overall size homogeneity of individuals within a size category cannot be indefinitely improved by the addition of more sizes--that is, by subdivision of the key dimensions into more and more increments. At some point the minimum level of within-group variance for the body dimensions in the design will be approached and, even by doubling the number of sizes, this level of within-a-size variance will remain essentially constant. For example, a shirt sized on neck circumference and sleeve length may be made in 20 sizes with four sleeve lengths for each of five neck sizes. By doubling the number of sizes a better fit in the key dimensions is achieved but this will not necessarily improve the fit at chest and waist. This is a function of the less than perfect relationships that other body dimensions have with the key dimensions by which the individuals in the size category are selected.

It is not only the body size variability that must be considered in establishing the sizing interval but factors such as the type of fit required, the material that will be used in fabrication, the cut and possibly the logistics of procurement and stocking of the final item. At some point, decisions will be made regarding the various trade-offs among the design considerations, and the sizing category intervals will be established. The major thrust of any such decision, of course, is to provide the best fit possible for the maximum number of users with the fewest number of sizes. Inevitably, there will be individuals within the design group who, because of extremes in body dimensions or unusual proportions, will not be satisfactorily fitted. An effective sizing scheme, however, will keep the number of individuals disaccommodated to a minimum.

In this report a number of alternative height/weight sizing programs are offered and guidelines for choosing the one best suited to a particular need are suggested in the concluding chapter. Selection of size intervals, of course, varies according to how many sizes are included in a given program.

STEP FOUR

The next step is to establish the dimensional data for each of the size categories. This is done by treating all the individuals in the sample who fall within the limits of a size category as a subsample and computing the means and standard deviations for each of the dimensions included in the design.

It can be seen, for instance, by reference to the height/weight bivariate table below (Figure 1), that the size intervals for the eight-size program are 4½ inches for height and 25 pounds for weight. For purposes of creating the dimensional data for the small-regular size category, all individuals who fell within

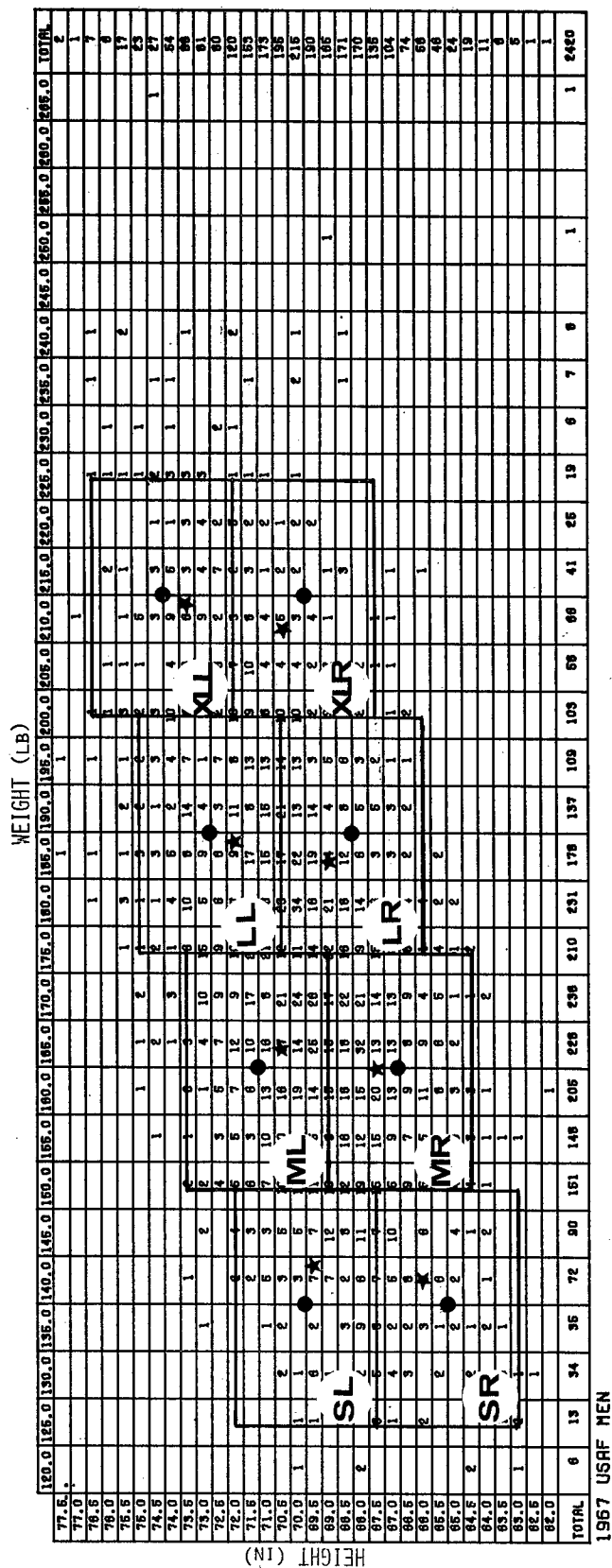


Figure 1. Height/weight bivariate distribution table for eight-size height/weight program.

the interval 63 to 67.49 inches and also weighed between 125 and 149.9 pounds became members of the small-regular subsample. Some 108 individuals or 4.46% of the total sample fell within these limits.

We must now establish dimensions for all the other variables. What are the crotch heights for this subset, the thigh circumferences, the hip breadths? The means and standard deviations for all the relevant variables are computed using the small-regular subsample. This step is, of course, repeated for each size category. For reasons relating to sampling stability, the standard deviations for the individual subsets are, in effect, averaged to provide for each dimension a single within-a-size standard deviation.

It would be possible at this stage to continue to the next step--the development of the design values derived directly from the dimensional data. It will be noted, however, from a study of Figure 1 that the distribution of individuals in the size categories is not uniform, particularly for those categories at the lower left and upper right of the height/weight distribution. Because of the uneven distribution, the computed mean values are unevenly weighted toward the center of the height/weight distribution of the mean value of the total population. In Figure 1, the mean height and weight for each size category subsample is indicated by a star (*) and contrasted with the interval mean that would be obtained if the individuals were equally distributed throughout the height/weight sizing interval (•). This is in essence the sizing category midpoint. While the differences between the mean values computed directly from the subgroup and the category interval midpoints are not large, on the order of 1.5% or less, they are sufficient to penalize the individuals in the least populated areas of the size category. To correct the problem caused by the distribution of subjects within a size category, the dimensional values are computed from multiple regression equations using the size category midpoints as predictors. The effect of this procedure is to even the distribution of heights and weights throughout each size category. The resulting predicted value is then used in conjunction with the within-a-size standard deviation to develop the next element in the sizing analysis, the design value.

STEP FIVE

The design value is a single numerical value for each variable that represents the actual body measurement for which a given end item will be designed. While the mean value of the small-regular size chest circumference in the eight-size system may be 35.7 inches, its design value may be set at the mean value plus 1.65 standard deviations (equivalent to the 95th percentile value), since it must be large enough to fit around the chest of the larger individuals in that size group. The design value for an elasticized wrist closure, on the other hand, may be the mean

value minus 1.65 standard deviations (equivalent to the 5th percentile) so that it will be small enough to seal the sleeve of the persons having the smaller wrist circumferences in the same size group. For each dimensional variable of interest and each size, there will be a specific design minimum and design maximum representing the range of adjustability that must be considered within that particular sizing category.

The design value can be any combination of the mean plus or minus some increment of the within-a-size standard deviation. Figure 2 shows the coverage of a normal distribution of values as a function of the plus or minus increments of standard deviation. (For all practical purposes, anthropometric dimensions are normally distributed.)

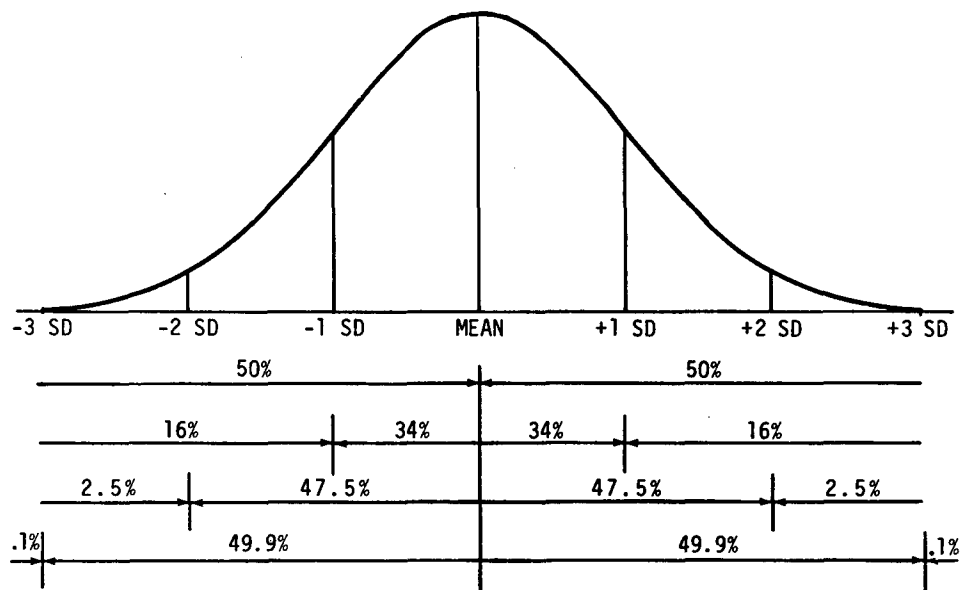


Figure 2. Areas under the normal curve.

The ranges suggested by the graph are from approximately three standard deviations below the mean ($\bar{X} - 3$ SD) to three standard deviations above it ($\bar{X} + 3$ SD). Other important points on the distribution of a set of anthropometric data can be located, at least approximately, by adding or subtracting a multiple of the standard deviation to the mean value. In particular, it is worth noting that:

about 2/3 of a set of data fall between $\bar{X} - 1.0$ SD and $\bar{X} + 1.0$ SD

about 87% of a set of data fall between $\bar{X} - 1.5$ SD and $\bar{X} + 1.5$ SD

about 90% of a set of data fall between $\bar{X} - 1.65$ SD and $\bar{X} + 1.65$ SD

about 95% of a set of data fall between $\bar{X} - 2.0$ SD and $\bar{X} + 2.0$ SD

almost all of a set of data fall between $\bar{X} - 3.0$ SD and $\bar{X} + 3.0$ SD

Design values equivalent to the mean plus or minus 1.65 standard deviations were selected because they encompass the central 90 percent of the individual values for a particular variable. To select the design values beyond these limits means increasing the range of adjustability that must be considered and may result in a poorer fit for the majority of users for the sake of accommodating the few persons with exceptionally high and low values for a particular dimension or group of dimensions. An individual whose height and weight measurements would indicate a probable fit in a large-regular size but who has exceptionally long arms or legs, for example, may well be accommodated by the large-long size. In some cases custom-design will be necessary.

It should be stressed that the design value is related to the body size of the population and should not be confused with actual garment and pattern measurements. To arrive at those values, seam allowances are added and, where necessary, varying increments to permit freedom of movement within the garment.

STEP SIX

The final step is to prepare a tariff for procurement of the various sizes. Usage rate will soon establish how many of what sizes must be purchased to maintain the stock of a particular item of clothing or personal-protective equipment. Initially, however, the tariff, which is based on the number or percentage of individuals in each size category, establishes the number of garments to be provided in each size. If one found, for example, that 4.8% of the sample accommodated within a size system fell within the small-regular category, the best initial procurement estimate for that size would be 48 units per thousand of the production run. Tariff percentages for the sizing programs in this report are given in the height/weight tables presented in Section IV. These tariffs are based on the assumption of the procurement of several thousands rather than the few dozen of an item.

The sequence of steps described above constitutes a well-tried procedure which has been successfully used to develop sizing programs for USAF flight clothing and protective garments in the past. The final test of a successful sizing program is the fitting of garments on a representative sample of the target population. Results of fit tests of four protective flight garments designed on the basis of a height/weight sizing system were reported by Emanuel et al. (1959) to exceed all expectations of success. Ninety-six percent of the test subjects were fitted by their indicated sizes and over half the remainder were accommodated by upgrading or downgrading of suit sizes.

SECTION III

EXPLANATION OF STATISTICAL TERMS

THE MEAN

This commonest of the statistics denoting an average value is widely understood. The arithmetic mean is simply the sum of a given set of values divided by the number of values. Thus, since the 2420 men measured in the 1967 USAF survey weighed a grand total of 420,112 pounds, their mean weight was

$$\bar{X} = \frac{\Sigma X}{N} = \frac{420,112}{2420} = 173.6 \text{ pounds}$$

where Σ is the summation operator, X represents the individual values, \bar{X} their arithmetic mean, and N the number of values. The mean is designated in the statistical literature by a variety of symbols the most common being M , μ and \bar{X} .

THE STANDARD DEVIATION

A basic measure of variability, the standard deviation (SD) indicates the extent to which the values cluster around the mean. If most of the data cluster close to their mean value, the standard deviation is low; if a large number of values in the set lie at some distance from the mean, the standard deviation is high. By definition the standard deviation is the root-mean square of the deviations from the arithmetic mean:

$$SD = \sqrt{\Sigma (X - \bar{X})^2 / N}$$

For the designer it is useful to know that about two-thirds of the values in a given set of data will fall between one standard deviation below and one standard deviation above the mean. Thus, when the mean height of the fliers was found to be 69.82 inches and the standard deviation 2.44 inches, it can be safely assumed that two-thirds of the 2420 subjects measured are between 67.38 and 72.26 inches tall. It is further true that 95% of a given sample will fall between two standard deviations below and two standard deviations above the mean and virtually all the subjects in a sample will be encompassed in a range from three standard deviations below the mean to three standard deviations above it.

THE COEFFICIENT OF VARIATION

This statistic, denoted in this report as CV, is a restatement of the standard deviation expressed as a percentage of the mean. The relationships noted for the standard deviation also pertain to the coefficient of variation. Thus, in the case of the USAF survey where mean height is about 70 inches and the coefficient of variation is 3.5%, about two-thirds of the men will, once again, be between 70 inches -3.5% and 70 inches +3.5% while 95% of the subjects will fall between 70 inches -7% and 70 inches +7%, etc.

CV is non-dimensional. It is an index to the variability of the values in relation to their size. Thus, for example, the variability of elbow height (variable #8) compared to mean elbow height is about the same as the variability of chest height (variable #7) compared to its mean.

The value of CV is often associated with the general anatomical nature of the variable involved. Long bone lengths, such as height and other height measurements, tend to have coefficients of variation which range from 3.5% to 5%. For fleshy circumference, CV ranges from 6% to 10%.

THE PERCENTILES

This group of statistics belongs to a class of measures designated as "measures of order or position." They can be thought of as being obtained by arranging the data in order from the smallest value to the largest one and then observing the value of the datum which lies at a specified position in the array. The smallest value, the next-to-the-largest value, the middle value, and the like are examples of this type of statistic. The 99 percentiles--ranging from the 1st to the 99th--are values at the points which separate consecutive blocks or units of 1% of the data in the ordered array. The first percentile is the value which separates the smallest 1% of the data from 99% of the data with larger values; the second percentile separates the smallest 2% from the larger 98% and so on.

Reported in Section IV are a limited number of percentile values ranging from the 1st to the 99th. These are useful to indicate to the designer what portion of the total population will be accommodated by a given size.

BIVARIATE FREQUENCY TABLES

Among the more graphic ways of presenting information on the various ways and degrees to which body dimensions are related to one another are bivariate frequency tables. The bivariate table shows the ranges of any two given measurements and the numbers of

subjects who fall within a particular range of values for one variable and simultaneously within a specified range for a second variable.

Referring back to the bivariate table shown in Figure 1, it will be noted that each row and column in the table has an inch and pound designation. The former is on the Y or vertical axis and the latter on the X or horizontal axis. Each numerical designation on the left and upper perimeter of the table is the midpoint value for a particular row or column. The first bivariate entry on the extreme lower left of the table shows one individual in the height/weight category of 63 inches and 120 pounds. This indicates that this individual, while perhaps not exactly 63 inches in height and 125 pounds in weight, falls within the limits of 62.75-63.24 inches and 117.50-122.49 pounds. Numbers along the right and lower periphery of the table are sums of the respective rows and columns.

Bivariate tables can be useful to clothing designers in a number of ways. As shown in Section IV, they are used to determine optimum size categories for alternative sizing systems with the aim of covering as wide a range as possible of the user population while retaining reasonable sizing increments. A second useful purpose served by the bivariate is establishment of the clothing tariff which is explained in Section II.

SECTION IV

THE HEIGHT/WEIGHT SIZING DATA

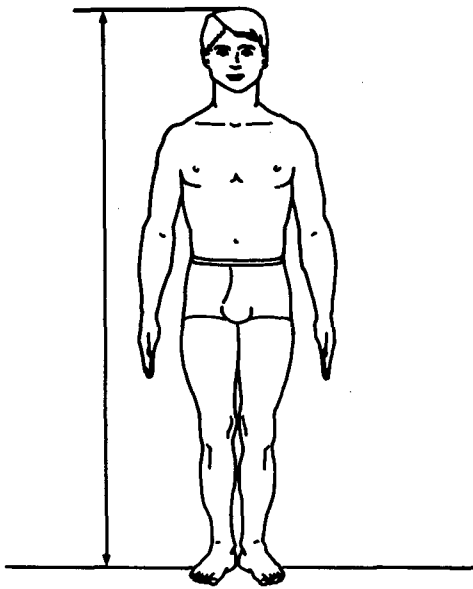
Presented in this section are four height/weight sizing systems with all the supporting data necessary to arrive at design values for garments for which height and weight of the user population are the key sizing dimensions. As the reader will recall, the six steps required in the formulation of a successful sizing program were outlined and explained in Section II. Appearing here is the "input" to be plugged into that process. By referring back to Section II as needed, the designer will be guided in the proper interpretation and use of the data in this section to achieve his particular end.

Steps one and two, selection of an appropriate sample population (1967 USAF) and choice of key sizing dimensions (height and weight), have already been established. Measurements of the key dimensions are described and illustrated in Figures 3 and 4.

Step three, selection of intervals for the key dimensions, is achieved by use of the bivariate distribution tables (Tables 1, 3, 5, and 7). As can be seen, the aim is to cover as large a portion of the user population as possible. Evenly spaced increments while not altogether essential are highly desirable. The resulting size categories are summarized in Tables 2, 4, 6, and 8. While it is virtually impossible to accommodate every single individual in a large fairly heterogeneous population, it should be noted that some number of persons around the fringes of the outlined size categories are nearly always accommodated by the sizes nearest to theirs. Thus, a sizing system which statistically encompasses only about 90% of the population will, in fact, usually accommodate closer to 95% of it.

Step four, establishing the dimensions for each size category, was done by analyzing the anthropometric data for each category in each sizing program to arrive at a usable range of values from which the design value will be selected. This analysis was carried out for 71 separate dimensions and the results constitute the bulk of the tables in this section. Accompanying the sizing data for each variable are a simplified line drawing and a measurement description to indicate as precisely as possible exactly what bodily dimension is referred to. A visual index precedes these tables to aid the designer in locating and identifying dimensions of interest.

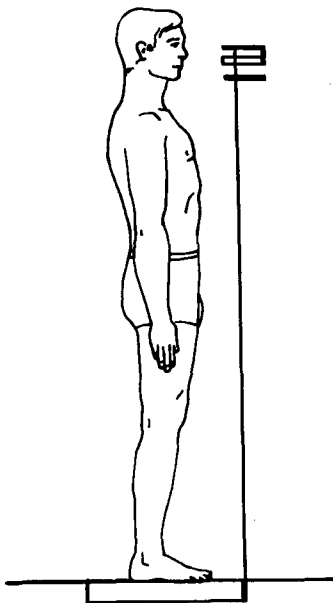
Step five, establishment of a single design value for each dimension, is the task of the designer and can be achieved by reference to the design minimum and maximum values in the following tables. Most design values will probably fall near the maximum values so as to accommodate at least 90% of the persons in



HEIGHT

Subject stands erect with head in the Frankfort plane. With the anthropometer arm touching the scalp, measure the vertical distance from the standing surface to the top of the head.

Figure 3. Height, as measured in the 1967 survey of USAF fliers.



WEIGHT

Subject is nude. The scale is read to the nearest pound.

Figure 4. Weight, as measured in the 1967 survey of USAF fliers.

that size group. Occasionally, as noted in Section II, when a portion of the garment must conform closely to the body for protective purposes, it may be elasticized and the design value will be the minimum one. Minimum and maximum design values can be expanded still farther by adding or subtracting more than 1.65 standard deviations to the mean value (see Section II).

Step six, the tariffs, can be provisionally established by reference to Tables 1, 3, 5, and 7 where they are based on the size categories delineated by the bivariate frequency tables. Fit testing of prototype garments, which should always precede final production, will sometimes result in modification of tariffs as they appear here.

TABLE 1

HEIGHT (IN)

TABLE 2

SIZE CATEGORIES AND TARIFF FOR
FOUR-SIZE HEIGHT/WEIGHT PROGRAM

Summary Statistics and Selected Percentiles for Total Sample (n=2420)

	Mean	SD	CV(%)	1%	5%	10%	25%	50%	75%	90%	95%	99%
Height (in)	69.82	2.44	3.5	64.2	65.8	66.7	68.1	69.8	71.5	73.0	73.9	75.6
Weight (lb)	173.60	21.44	12.3	127.8	140.2	146.9	158.5	172.4	187.5	202.0	211.0	227.9

Size Categories		
Size	Weight	Height
Small	125.00-149.99	63.50-69.99
Medium	150.00-174.99	65.50-71.99
Large	175.00-199.99	67.50-73.99
Extra Large	200.00-224.99	69.50-75.99

Tariff (%)

	Small	Medium	Large	Extra Large
	11.62	43.21	34.96	10.21

TABLE 3

HEIGHT (N)

TABLE 4

SIZE CATEGORIES AND TARIFF FOR
SIX-SIZE HEIGHT/WEIGHT PROGRAM

Summary Statistics and Selected Percentiles for Total Sample (n=2420)

	Mean	SD	CV(%)	1%	5%	10%	25%	50%	75%	90%	95%	99%
Height (in)	69.82	2.44	3.5	64.2	65.8	66.7	68.1	69.8	71.5	73.0	73.9	75.6
Weight (lb)	173.60	21.44	12.3	127.8	140.2	146.9	158.5	172.4	187.5	202.0	211.0	227.9

Size Categories		
Size	Weight	Height
Small Regular	130.00-159.99	63.00-67.99
Small Long	130.00-159.99	68.00-72.99
Medium Regular	160.00-189.99	64.50-69.49
Medium Long	160.00-189.99	69.50-74.49
Large Regular	190.00-219.99	66.00-70.99
Large Long	190.00-219.99	71.00-75.99

<u>Tariff (%)</u>											
Small Regular	11.46	Small Long	14.25	Medium Regular	25.08	Medium Long	29.41	Large Regular	8.21	Large Long	11.59

TABLE 5

BIVARIATE DISTRIBUTION ILLUSTRATING
EIGHT-SIZE HEIGHT/WEIGHT PROGRAM

HEIGHT (IN)	WEIGHT (LB)																				TOTAL												
	120.0	125.0	130.0	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0	180.0	185.0	190.0	195.0	200.0	205.0	210.0	215.0		220.0	225.0	230.0	235.0	240.0	245.0	250.0	255.0	260.0	265.0	270.0	
77.0																																	1
77.5																																	1
78.0																																	0
78.5																																	0
79.0																																	0
79.5																																	0
80.0																																	0
80.5																																	0
81.0																																	0
81.5																																	0
82.0																																	0
82.5																																	0
83.0																																	0
83.5																																	0
84.0																																	0
84.5																																	0
85.0																																	0
85.5																																	0
86.0																																	0
86.5																																	0
87.0																																	0
87.5																																	0
88.0																																	0
88.5																																	0
89.0																																	0
89.5																																	0
90.0																																	0
90.5																																	0
91.0																																	0
91.5																																	0
92.0																																	0
92.5																																	0
93.0																																	0
93.5																																	0
94.0																																	0
94.5																																	0
95.0																																	0
95.5																																	0
96.0																																	0
96.5																																	0
97.0																																	0
97.5																																	0
98.0																																	0
98.5																																	0
99.0																																	0
99.5																																	0
100.0																																	0
100.5																																	0
101.0																																	0
101.5																																	0
102.0																																	0
102.5																																	0
103.0																																	0
103.5																																	0
104.0																																	0
104.5																																	0
105.0																																	0
105.5																																	0
106.0																																	0
106.5																																	0
107.0																																	0
107.5																																	0
108.0																																	0
108.5																																	0
109.0																																	0
109.5																																	0
110.0																																	0
110.5																																	0
111.0																																	0
111.5																																	0
112.0																																	0
112.5																																	0
113.0																																	0
113.5																																	0
114.0																																	

TABLE 6

SIZE CATEGORIES AND TARIFF FOR
EIGHT-SIZE HEIGHT/WEIGHT PROGRAM

Summary Statistics and Selected Percentiles for Total Sample (n=2420)

	Mean	SD	CV(%)	1%	5%	10%	25%	50%	75%	90%	95%	99%
Height (in)	69.82	2.44	3.5	64.2	65.8	66.7	68.1	69.8	71.5	73.0	73.9	75.6
Weight (lb)	173.60	21.44	12.3	127.8	140.2	146.9	158.5	172.4	187.5	202.0	211.0	227.9

Size Categories		
Size	Weight	Height
Small Regular	125.00-149.00	63.00-67.49
Small Long	125.00-149.00	67.50-71.99
Medium Regular	150.00-174.00	64.50-68.99
Medium Long	150.00-174.00	69.00-73.49
Large Regular	175.00-199.00	66.00-70.49
Large Long	175.00-199.00	70.50-74.99
X-Large Regular	200.00-224.00	67.50-71.99
X-Large Long	200.00-224.00	72.00-76.49

		Tariff (%)			
Small Regular	4.84	Small Long	7.76	Medium Regular	21.52
				Medium Long	21.61
				Large Regular	17.04
				Large Long	16.95
				X-Large Regular	4.39
				X-Large Long	5.87

TABLE 7

HEIGHT (IN)

TABLE 8

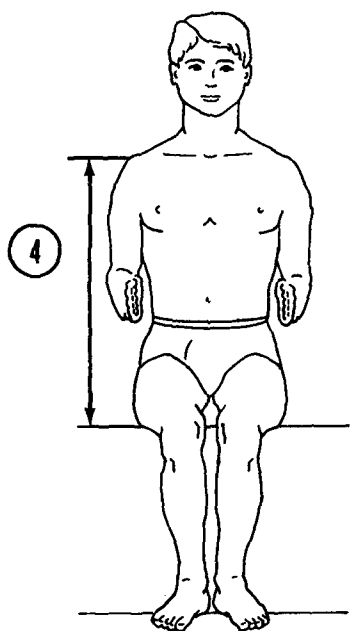
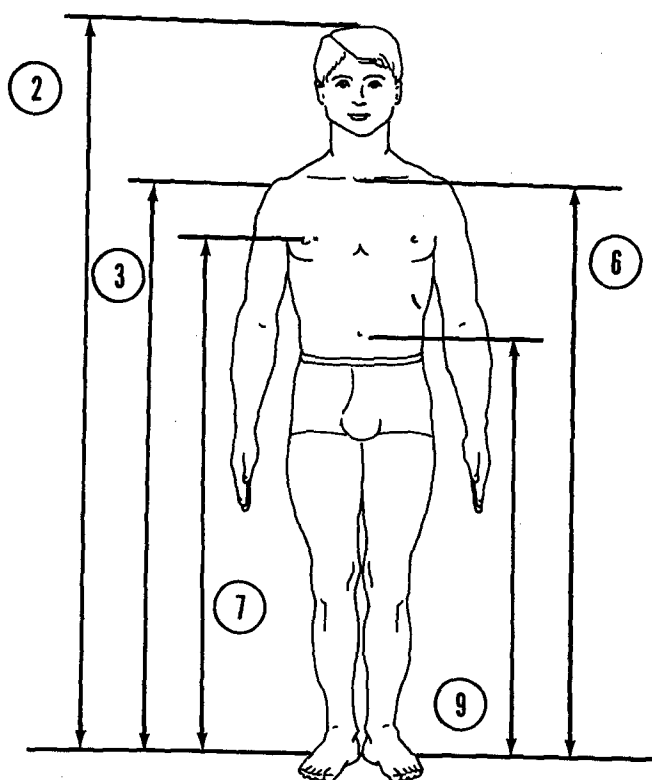
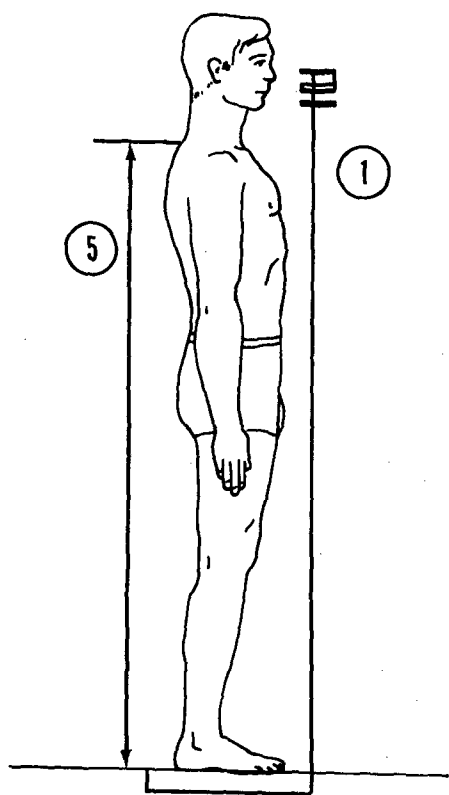
SIZE CATEGORIES AND TARIFF FOR
TWELVE-SIZE HEIGHT/WEIGHT PROGRAM

Summary Statistics and Selected Percentiles for Total Sample (n=2420)

	Mean	SD	CV(%)	1%	5%	10%	25%	50%	75%	90%	95%	99%
Height (in)	69.82	2.44	3.5	64.2	65.8	66.7	68.1	69.8	71.5	73.0	73.9	75.6
Weight (lb)	173.60	21.44	12.3	127.8	140.2	146.9	158.5	172.4	187.5	202.0	211.0	227.9

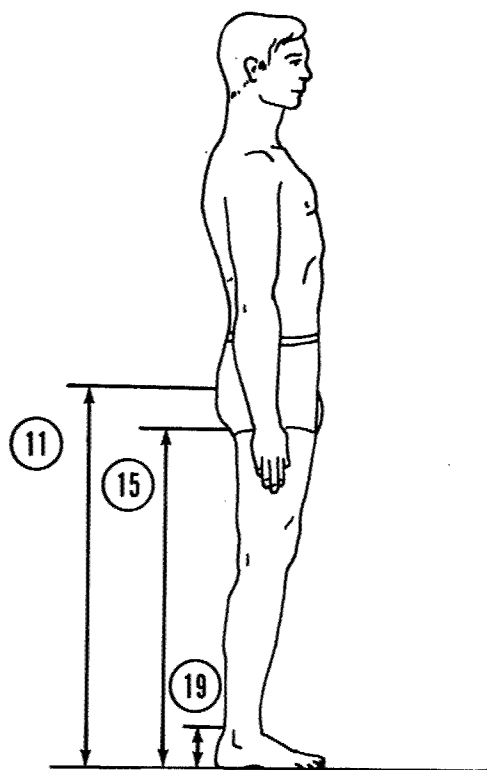
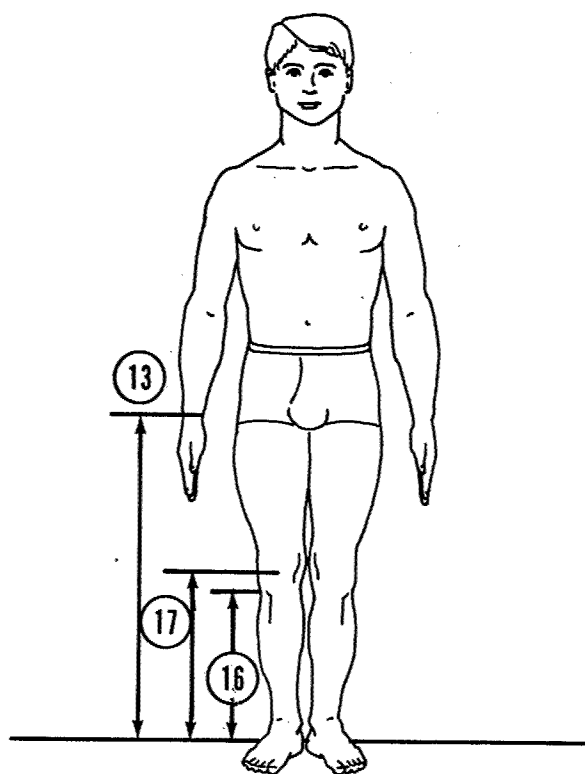
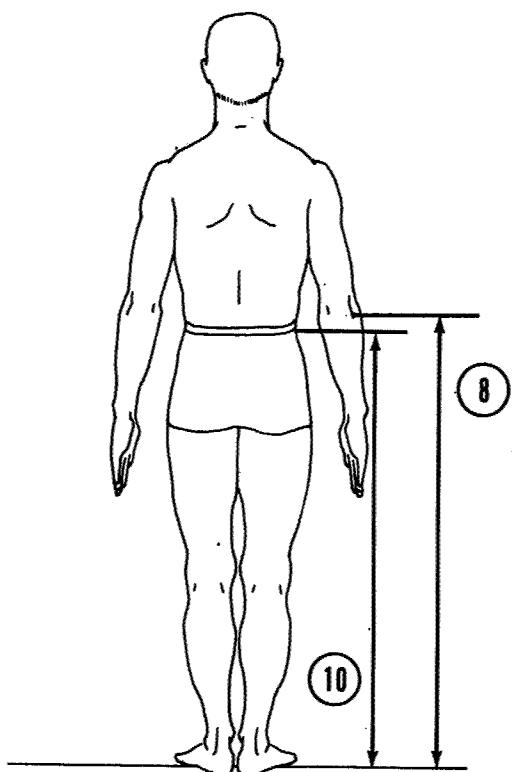
Size Categories		
Size	Weight	Height
Small Short	125.00-149.00	63.00-65.99
Small Regular	125.00-149.00	66.00-68.99
Small Long	125.00-149.00	69.00-71.99
Medium Short	150.00-174.00	64.50-67.49
Medium Regular	150.00-174.00	67.50-70.49
Medium Long	150.00-174.00	70.50-73.49
Large Short	175.00-199.00	66.00-68.99
Large Regular	175.00-199.00	69.00-71.99
Large Long	175.00-199.00	72.00-74.99
X-Large Short	200.00-224.00	67.50-70.49
X-Large Regular	200.00-224.00	70.50-73.49
X-Large Long	200.00-224.00	73.50-76.49

<u>Tariff (%)</u>											
Small Short	Small Reg.	Small Long	Med. Short	Med. Reg.	Med. Long	Large Short	Large Reg.	Large Long	X-Large Short	X-Large Reg.	X-Large Long
2.15	6.41	4.04	8.88	23.50	10.76	7.44	19.37	7.17	2.02	5.34	2.91

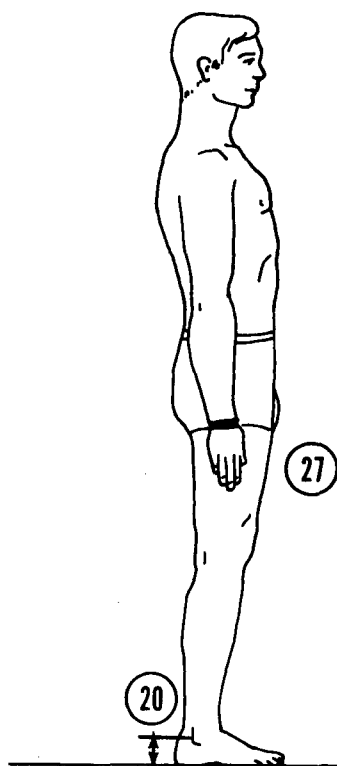
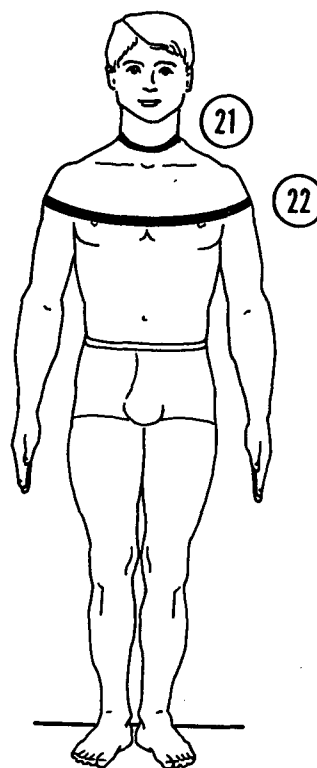
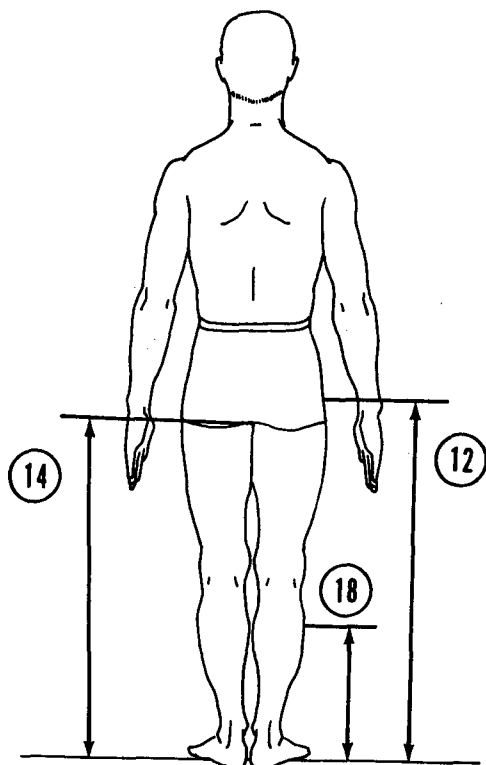


VISUAL INDEX

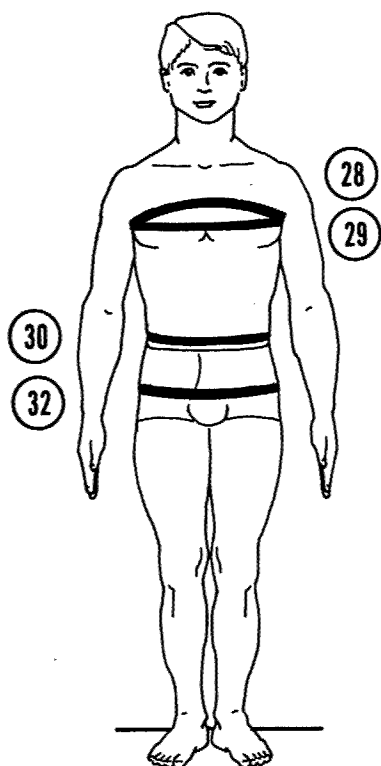
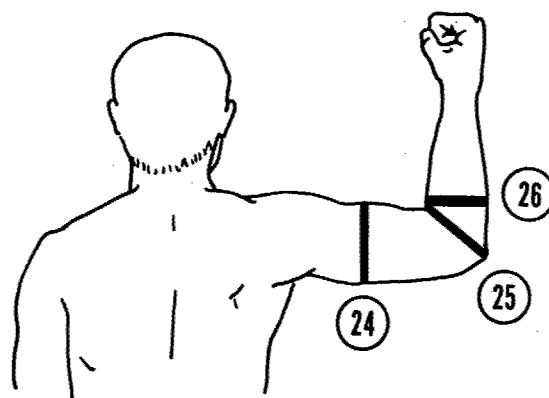
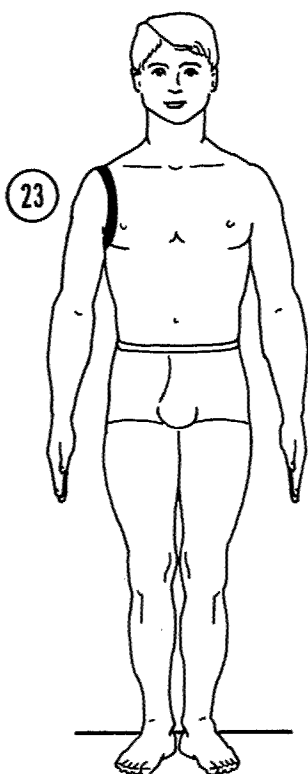
1. Weight
2. Height
3. Shoulder (Acromion) Height
4. Shoulder Height, Sitting
5. Cervicale Height
6. Suprasternale Height
7. Chest Height
9. Waist (Omphalion) Height



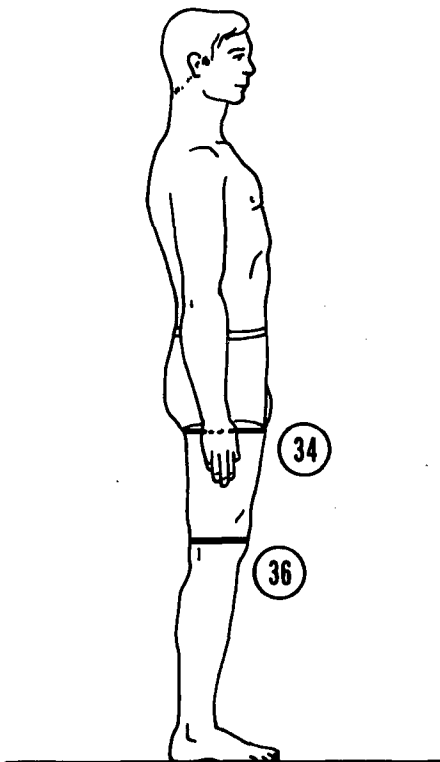
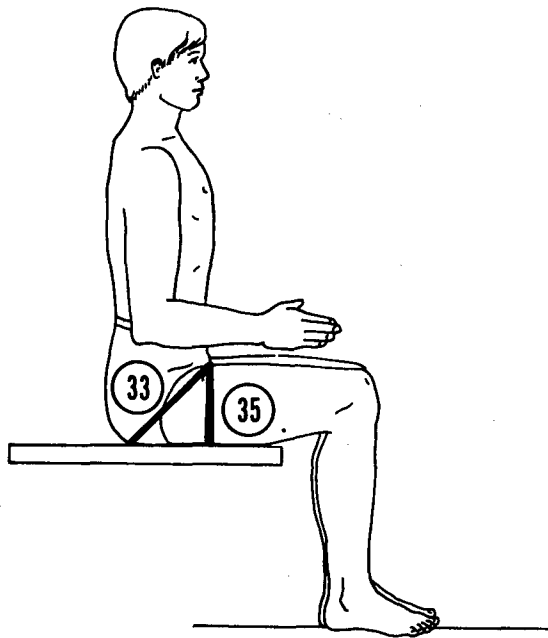
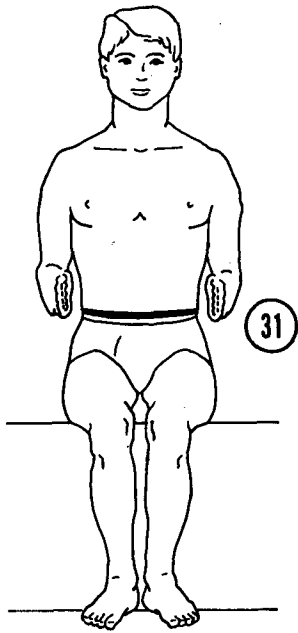
- 8. Elbow (Radiale) Height
- 10. Iliocristale Height
- 11. Buttock Height
- 13. Wrist (Stylion) Height
- 15. Gluteal Furrow Height
- 16. Knee (Fibular) Height
- 17. Knee Circumference Height
- 19. Ankle Height



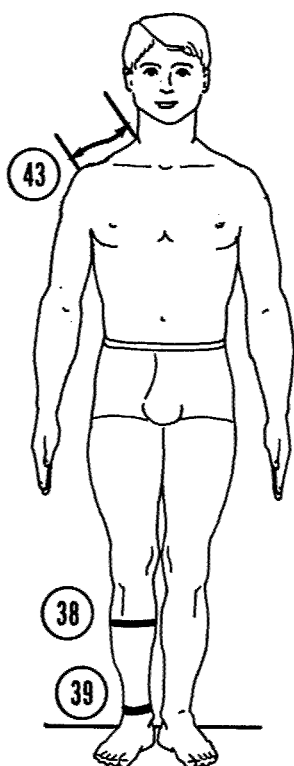
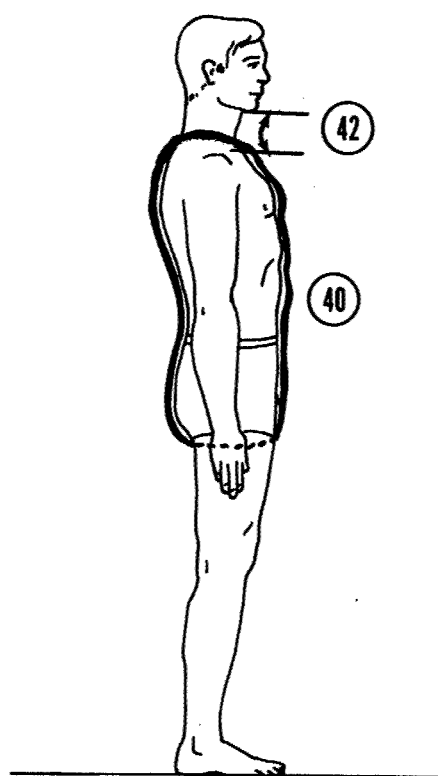
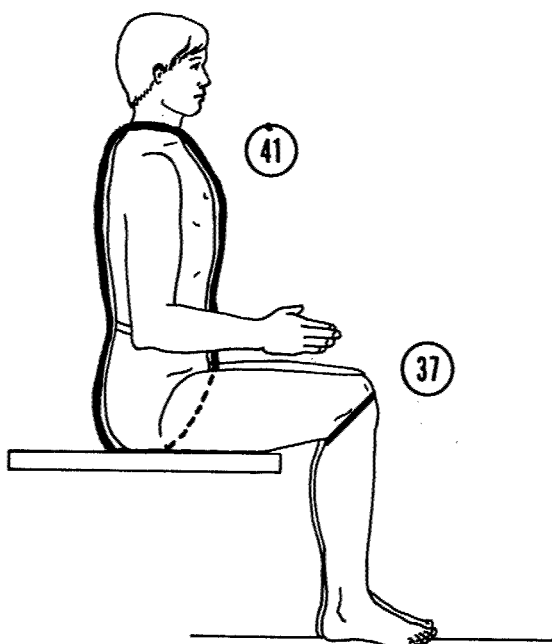
- 12. Hip (Trochanteric) Height
- 14. Crotch Height
- 18. Calf Height
- 20. Lateral Malleolus Height
- 21. Neck Circumference,
Maximum
- 22. Shoulder Circumference
- 27. Wrist Circumference



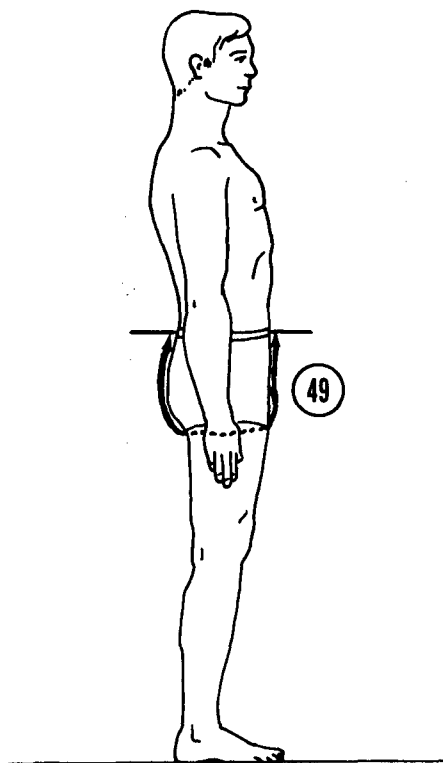
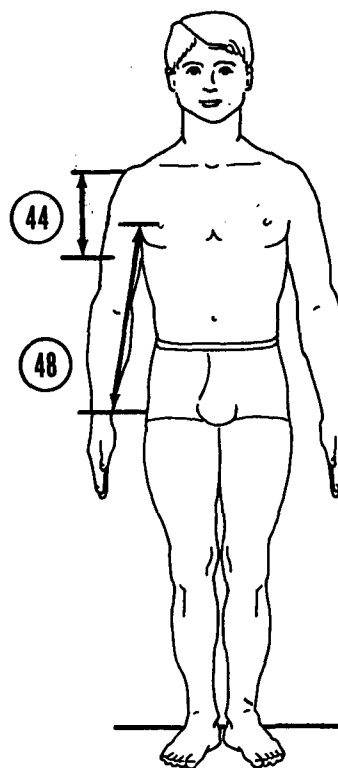
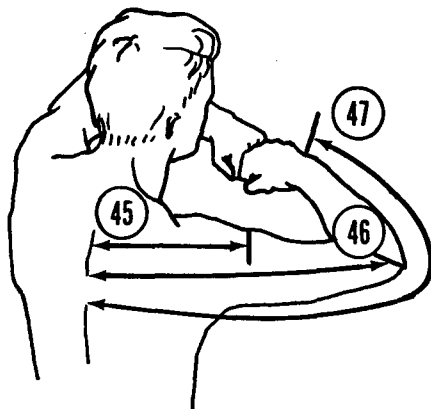
- 23. Scye Circumference
- 24. Biceps Circumference,
Flexed
- 25. Elbow Circumference,
Flexed
- 26. Lower Arm Circumference,
Flexed
- 28. Chest Circumference at Scye
- 29. Chest Circumference
- 30. Waist Circumference
- 32. Buttock Circumference



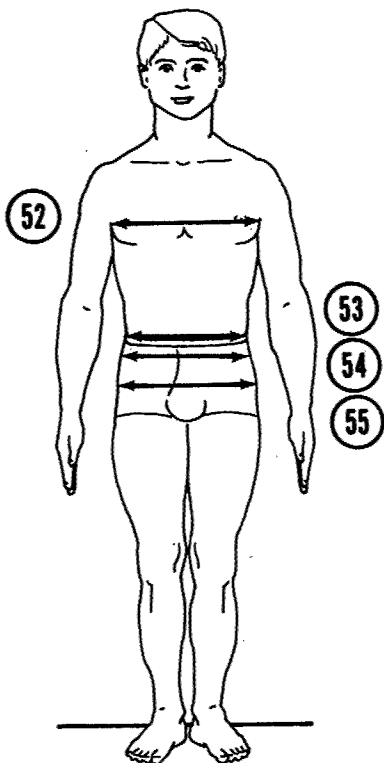
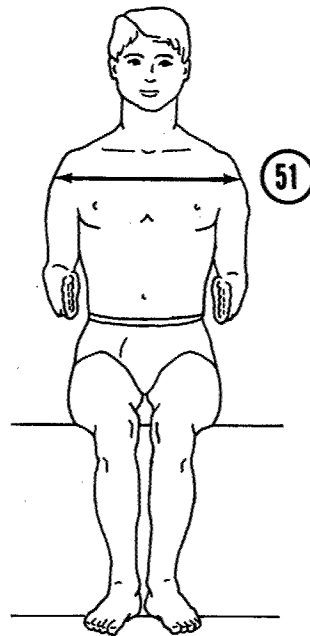
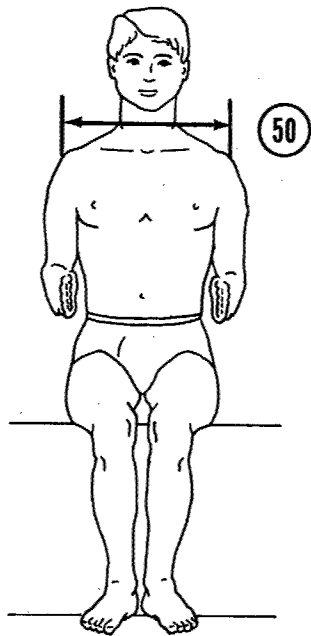
- 31. Waist Circumference, Sitting
- 33. Buttock Circumference, Sitting
- 34. Upper Thigh Circumference
- 35. Upper Thigh Circumference, Sitting
- 36. Knee Circumference



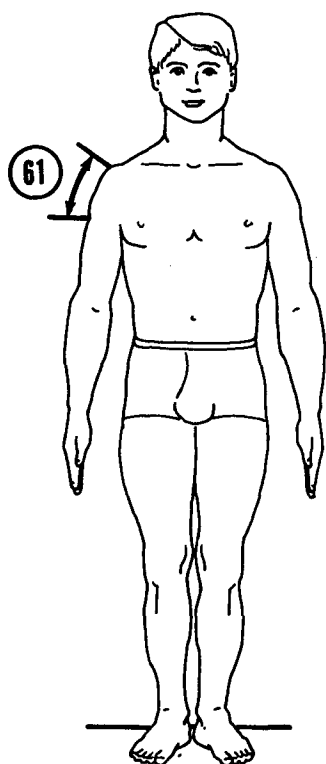
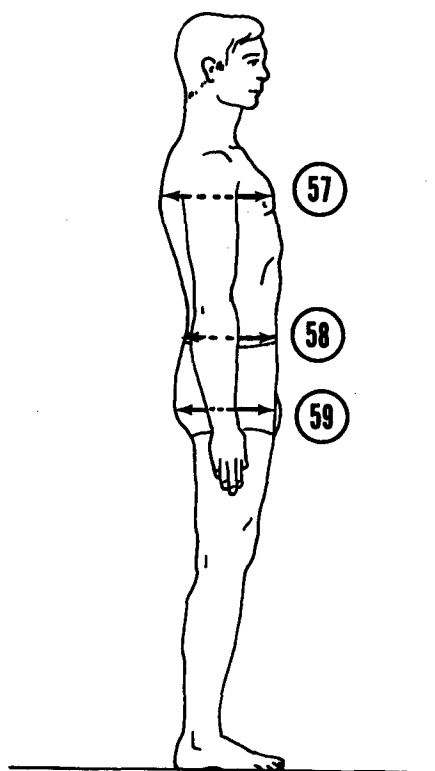
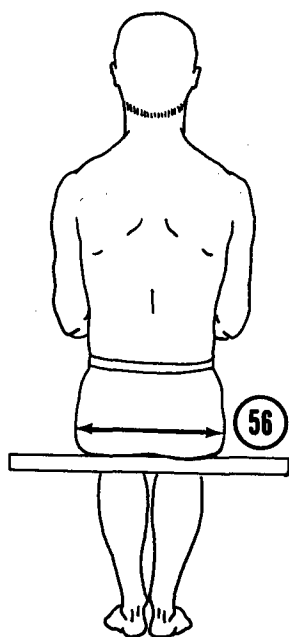
- 37. Knee Circumference, Sitting
- 38. Calf Circumference
- 39. Ankle Circumference
- 40. Vertical Trunk Circumference
- 41. Vertical Trunk Circumference, Sitting
- 42. Anterior Neck Length
- 43. Shoulder Length



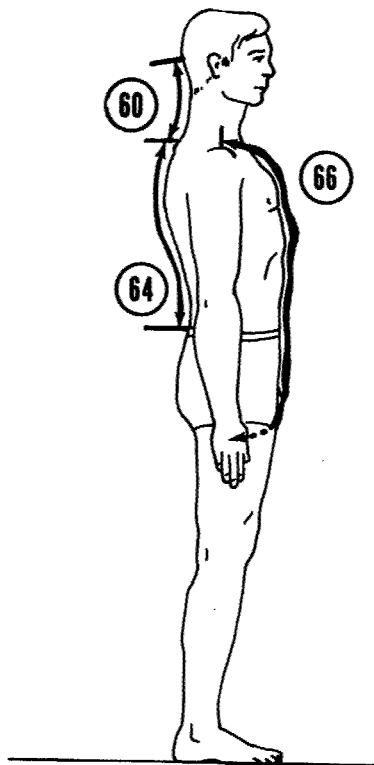
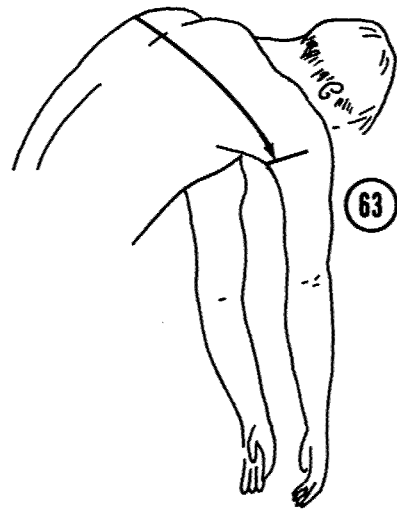
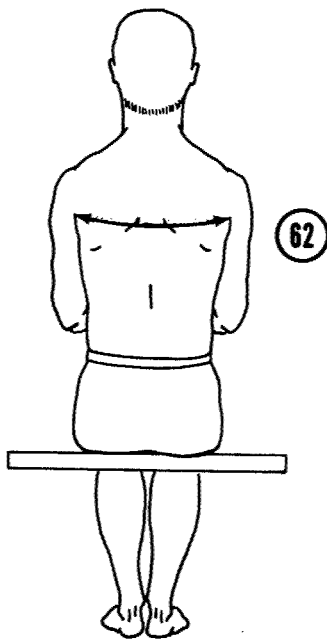
- 44. Acromion-Biceps Circumference Level Length
- 45. Sleeve Length, Spine-Scye
- 46. Sleeve Length, Spine-Elbow
- 47. Sleeve Length, Spine-Wrist
- 48. Sleeve Inseam Length
- 49. Crotch Length



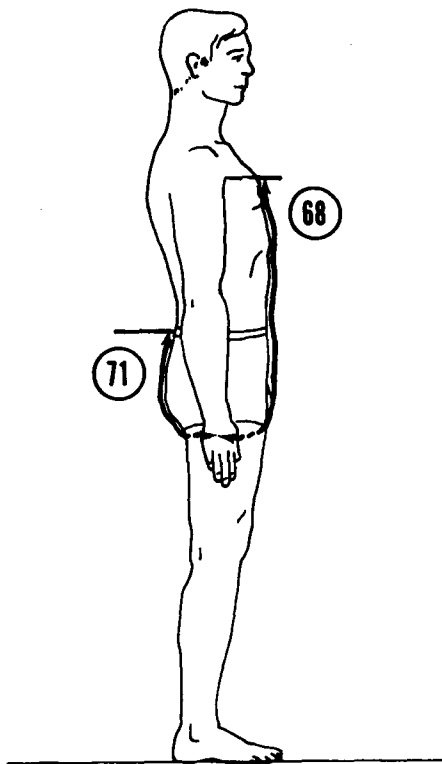
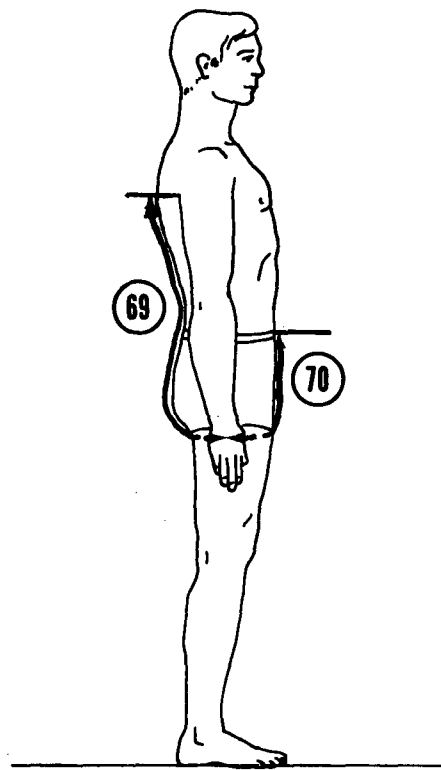
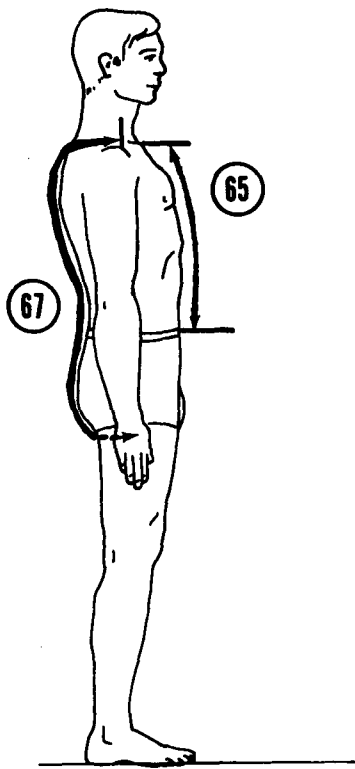
- 50. Biacromial Breadth
- 51. Shoulder (Bideloid) Breadth
- 52. Chest Breadth
- 53. Waist Breadth
- 54. Bicristale Breadth
- 55. Hip Breadth



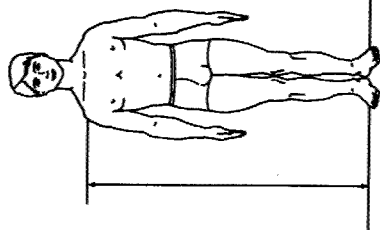
- 56. Hip Breadth, Sitting
- 57. Chest Depth
- 58. Waist Depth
- 59. Buttock Depth
- 61. Deltoid Curvature



- 60. Posterior Neck
- 62. Interscye Curvature
- 63. Interscye Curvature,
Maximum
- 64. Waist Back Curvature
- 66. Crotch (Scrotale)-to-
Midshoulder Level
Curvature, Anterior



- 65. Waist Front Curvature
- 67. Crotch (Scrotale)-to-Midshoulder
Curvature Over Buttock
- 68. Crotch (Scrotale)-to-Anterior
Scye Level Curvature
- 69. Crotch (Scrotale)-to-Posterior
Scye Level Curvature
- 70. Crotch (Scrotale)-to-Anterior
Waist Level Curvature
- 71. Crotch (Scrotale)-to-Waist Level
Curvature Over Buttock



3 SHOULDER (ACROMION) HEIGHT

SUBJECT STANDS ERECT, USING THE ANTHROPOMETER, MEASURE THE VERTICAL DISTANCE FROM THE STANDING SURFACE TO THE RIGHT ACROMIAL LANDMARK.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
57.17	2.27	4.0%	51.7	53.4	54.2	55.6	57.1	58.7	60.1	61.0	62.4

FOUR SIZE SYSTEM (SD=1.72 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	51.4	53.3	55.2	57.2
DESIGN MAXIMUM	54.2	56.2	58.1	60.0
	57.1	59.0	60.9	62.8

SIX SIZE SYSTEM (SD=1.38 IN.)

DESIGN MINIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG
SIZE MEAN	50.9	51.0	52.5	54.0	55.8	56.8	58.3	59.3
DESIGN MAXIMUM	53.0	53.2	54.8	56.3	58.0	59.0	60.6	61.3
	55.1	55.5	57.1	58.6	60.3	61.3	62.8	63.4

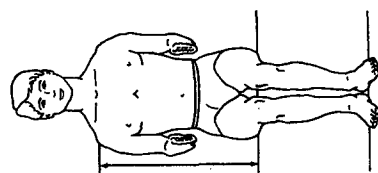
EIGHT SIZE SYSTEM (SD=1.27 IN.)

DESIGN MINIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	50.7	50.9	52.4	54.0	55.8	56.8	58.3	59.3	60.3	61.3	62.8	63.4
DESIGN MAXIMUM	52.3	53.0	54.4	56.0	57.9	58.9	60.4	61.9	63.4	64.4	65.9	66.9

TWELVE SIZE SYSTEM (SD= .97 IN.)

DESIGN MINIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	50.7	50.9	52.4	54.0	55.8	56.8	58.3	59.3	60.3	61.3	62.8	63.4
DESIGN MAXIMUM	52.3	53.0	54.4	56.0	57.9	58.9	60.4	61.9	63.4	64.4	65.9	66.9

④ SHOULDER (ACROMION) HEIGHT, SITTING



SUBJECT SITS ERECT, HIS HEAD IN THE FRANKFURT PLANE, HIS UPPER ARMS HANGING RELAXED, AND HIS FOREARMS AND HANDS EXTENDED FORWARD HORIZONTALLY. USING AN ANTHROPOMETER, MEASURE THE VERTICAL DISTANCE FROM THE SITTING SURFACE TO THE RIGHT ACROMIAL LANDMARK.

MEAN	SD	CV	1%	5%	TOTAL SAMPLE				75%	90%	95%	99%
					10%	25%	50%	75%				
24.04	1.12	4.7%	21.3	22.1	22.5	23.2	24.0	24.8	25.6	26.0	26.7	

FOUR SIZE SYSTEM (SD= .96 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	21.3	22.1	22.8	23.6
DESIGN MAXIMUM	22.9	23.6	24.4	25.2
	24.5	25.2	26.0	26.8

SIX SIZE SYSTEM (SD= .91 IN.)

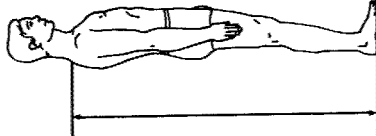
DESIGN MINIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG
SIZE MEAN	21.1	22.4	21.8	23.1	22.5	23.8
DESIGN MAXIMUM	22.7	23.9	23.4	24.6	24.1	25.3
	24.2	25.4	24.9	26.1	25.6	26.8

EIGHT SIZE SYSTEM (SD= .90 IN.)

DESIGN MINIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG	X-LARGE REGULAR	X-LARGE LONG
SIZE MEAN	21.0	22.1	21.7	22.8	22.3	23.4	23.0	24.1
DESIGN MAXIMUM	22.5	23.6	23.2	24.3	23.8	24.9	24.4	25.5
	24.0	25.1	24.6	25.7	25.3	26.4	25.9	27.0

TWELVE SIZE SYSTEM (SD= .87 IN.)

DESIGN MINIMUM	SMALL SHORT	SMALL REGULAR	SMALL LONG	MEDIUM SHORT	MEDIUM REGULAR	MEDIUM LONG	LARGE SHORT	LARGE REGULAR	LARGE LONG	X-LARGE SHORT	X-LARGE REGULAR	X-LARGE LONG
SIZE MEAN	20.9	21.6	22.4	21.5	22.3	23.0	22.2	22.9	23.7	22.8	23.6	24.3
DESIGN MAXIMUM	22.3	23.1	23.8	23.0	23.7	24.4	23.6	24.4	25.1	24.3	25.0	25.7
	23.8	24.5	25.2	24.4	25.1	25.9	25.0	25.8	26.5	25.7	26.4	27.2



⑤ CERVICALE HEIGHT

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFORT PLANE, USING AN ANTHROPOMETER, MEASURE THE VERTICAL DISTANCE FROM THE STANDING SURFACE TO THE CERVICALE LANDMARK.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
59.87	2.29	3.8%	54.4	56.1	56.9	58.3	59.8	61.4	62.9	63.7	65.4

FOUR SIZE SYSTEM (SD=1.76 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	54.1	56.0	57.9	59.7
DESIGN MAXIMUM	57.0	58.9	60.8	62.7
	59.9	61.8	63.7	65.6

SIX SIZE SYSTEM (SD=1.39 IN.)

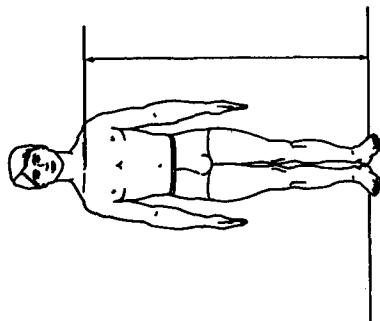
DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
SIZE MEAN	53.5	55.9	57.6	58.1	59.0	59.5	59.5	60.5	61.0
DESIGN MAXIMUM	55.6	58.1	59.7	60.4	61.1	61.8	61.8	62.6	63.3
	57.7	60.1	61.8	62.7	63.2	64.1	64.1	64.6	65.6

EIGHT SIZE SYSTEM (SD=1.27 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	53.5	55.9	57.6	58.1	59.0	59.5	59.5	60.5	61.0	61.0	61.0	61.9
DESIGN MAXIMUM	55.6	58.1	59.7	60.4	61.1	61.8	61.8	62.6	63.3	63.3	63.3	64.0
	57.7	60.1	61.8	62.7	63.2	64.1	64.1	64.6	65.6	65.6	65.6	66.1

TWELVE SIZE SYSTEM (SD= .92 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	53.4	55.8	57.6	58.1	59.0	59.5	59.5	60.5	61.0	61.0	61.0	61.9
DESIGN MAXIMUM	54.9	57.6	59.1	60.1	60.6	61.1	61.1	61.6	62.1	62.1	62.1	63.0
	56.4	58.9	60.4	61.4	61.9	62.4	62.4	62.9	63.4	63.4	63.4	64.3



⑥ SUPRASTERNALE HEIGHT

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFORT PLANE. USING AN ANTHROPOMETER, MEASURE THE VERTICAL DISTANCE FROM THE STANDING SURFACE TO THE SUPRASTERNALE LANDMARK.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
57.16	2.17	3.8%	52.1	53.6	54.4	55.7	57.1	58.6	60.1	60.9	62.4

FOUR SIZE SYSTEM (SD=1.63 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
51.6	54.3	57.0	51.6	53.5	55.3	57.2
51.6	54.3	57.0	54.3	56.2	58.0	59.9
51.6	54.3	57.0	57.0	58.9	60.7	62.6

SIX SIZE SYSTEM (SD=1.29 IN.)

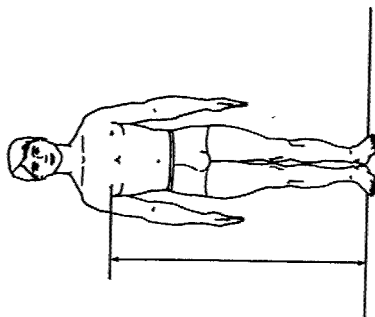
DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	MEDIUM	REGULAR	LARGE	REGULAR	LARGE	LONG
51.1	53.1	55.1	51.1	52.7	54.3	55.9	56.9	58.0	59.0	60.1	61.1	62.6
51.1	53.1	55.1	52.7	54.3	55.9	57.5	58.6	59.7	60.8	61.9	63.0	64.1
51.1	53.1	55.1	54.3	55.9	57.5	59.1	60.2	61.3	62.4	63.5	64.6	65.7

EIGHT SIZE SYSTEM (SD=1.18 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	MEDIUM	REGULAR	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
51.1	53.1	55.1	51.1	52.7	54.3	55.9	56.9	58.0	59.0	60.1	61.1	62.6	64.1	65.7	67.3	68.9
51.1	53.1	55.1	52.7	54.3	55.9	57.5	58.6	59.7	60.8	61.9	63.0	64.1	65.2	66.3	67.4	68.5
51.1	53.1	55.1	54.3	55.9	57.5	59.1	60.2	61.3	62.4	63.5	64.6	65.7	66.8	67.9	69.0	70.1

TWELVE SIZE SYSTEM (SD= .86 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	MEDIUM	REGULAR	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
51.0	52.5	54.0	51.0	52.5	54.0	55.5	56.5	57.5	58.5	59.5	60.5	61.5	62.5	63.5	64.5	65.5
51.0	52.5	54.0	52.5	54.0	55.5	57.0	58.0	59.0	60.0	61.0	62.0	63.0	64.0	65.0	66.0	67.0
51.0	52.5	54.0	54.0	55.5	57.0	58.5	59.5	60.5	61.5	62.5	63.5	64.5	65.5	66.5	67.5	68.5



⑦ CHEST HEIGHT

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFURT PLANE, USING AN ANTHROPOMETER, MEASURE THE VERTICAL DISTANCE FROM THE STANDING SURFACE TO THE CENTER OF THE RIGHT NIPPLE.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
50.88	2.06	4.1%	46.0	47.5	48.2	49.5	50.8	52.3	53.6	54.4	55.9

FOUR SIZE SYSTEM (SD=1.65 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
45.2	47.4	49.6	45.7	47.3	48.9	50.5
47.2	49.4	51.6	48.4	50.0	51.6	53.2
49.2	51.4	53.6	51.1	52.7	54.3	55.9

SIX SIZE SYSTEM (SD=1.33 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG
45.2	47.2	49.2	45.7	47.3	48.9	50.5	52.1	53.7	55.3	56.9	58.5	60.1
47.2	49.2	51.2	48.4	50.0	51.6	53.2	54.8	56.4	58.0	59.6	61.2	62.8
49.2	51.2	53.2	51.1	52.7	54.3	55.9	57.5	59.1	60.7	62.3	63.9	65.5

EIGHT SIZE SYSTEM (SD=1.23 IN.)

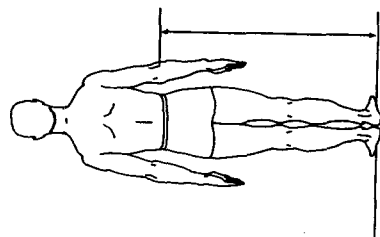
DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
45.2	47.2	49.2	45.7	47.3	48.9	50.5	52.1	53.7	55.3	56.9	58.5	60.1	61.7	63.3	64.9	66.5
47.2	49.2	51.2	48.4	50.0	51.6	53.2	54.8	56.4	58.0	59.6	61.2	62.8	64.4	66.0	67.6	69.2
49.2	51.2	53.2	51.1	52.7	54.3	55.9	57.5	59.1	60.7	62.3	63.9	65.5	67.1	68.7	70.3	71.9

TWELVE SIZE SYSTEM (SD= .95 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
45.2	47.2	49.2	45.7	47.3	48.9	50.5	52.1	53.7	55.3	56.9	58.5	60.1	61.7	63.3	64.9	66.5
47.2	49.2	51.2	48.4	50.0	51.6	53.2	54.8	56.4	58.0	59.6	61.2	62.8	64.4	66.0	67.6	69.2
49.2	51.2	53.2	51.1	52.7	54.3	55.9	57.5	59.1	60.7	62.3	63.9	65.5	67.1	68.7	70.3	71.9

8 ELBOW (RADIALE) HEIGHT

SUBJECT STANDS ERECT, HIS ARMS HANGING NATURALLY AT HIS SIDES. USING THE ANTHRO-
POMETER, MEASURE THE VERTICAL DISTANCE FROM THE STANDING SURFACE TO THE RADIALE
LANDMARK ON THE RIGHT ELBOW.



MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
44.21	1.80	4.1%	39.9	41.2	41.9	43.0	44.2	45.5	46.6	47.3	48.5

FOUR SIZE SYSTEM (SD=1.37 IN.)

	SMALL	MEDIUM	LARGE	EXTRA LARGE
DESIGN MINIMUM	39.6	41.2	42.7	44.2
SIZE MEAN	41.9	43.4	44.9	46.4
DESIGN MAXIMUM	44.2	45.7	47.2	48.7

SIX SIZE SYSTEM (SD=1.14 IN.)

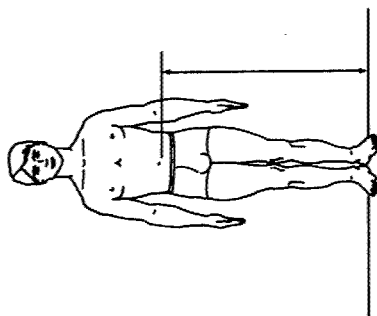
	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
DESIGN MINIMUM	39.2	42.0	42.5	40.5	42.4	43.7	41.8	43.7	45.0
SIZE MEAN	40.9	43.8	44.4	42.4	44.3	45.6	43.7	45.6	46.9
DESIGN MAXIMUM	42.7	45.6	46.2	44.3	46.2	47.5	45.6	47.5	48.7

EIGHT SIZE SYSTEM (SD=1.07 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	39.2	42.0	42.5	40.4	42.1	43.2	41.6	43.5	44.4	42.8	44.5	45.6
SIZE MEAN	40.9	43.8	44.4	42.1	43.9	45.0	43.3	45.1	46.2	44.5	46.3	47.4
DESIGN MAXIMUM	42.7	45.6	46.2	43.9	45.7	46.8	45.1	46.9	48.0	46.3	48.1	49.2

TWELVE SIZE SYSTEM (SD= .88 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	39.0	40.9	42.8	40.2	42.1	44.0	41.4	43.3	45.2	42.6	44.5	46.4
SIZE MEAN	40.5	42.4	44.3	41.7	43.6	45.5	42.9	44.8	46.7	44.1	46.0	47.9
DESIGN MAXIMUM	41.9	43.8	45.7	43.1	45.0	46.9	44.3	46.2	48.1	45.5	47.4	49.3



⑨ WAIST (OMPHALION) HEIGHT

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFORT PLANE. USING AN ANTHROPOMETER, MEASURE THE DISTANCE FROM THE STANDING SURFACE TO THE OMPHALION LANDMARK. THE SUBJECT MUST NOT PULL IN HIS STOMACH.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
41.92	1.86	4.4%	37.6	38.8	39.5	40.6	41.9	43.2	44.4	45.1	46.4

FOUR SIZE SYSTEM (SD=1.55 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	37.3	38.6	40.0	41.3
DESIGN MAXIMUM	39.9	41.2	42.5	43.8
	42.4	43.8	45.1	46.4

SIX SIZE SYSTEM (SD=1.27 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
SIZE MEAN	36.8	38.9	40.5	37.7	39.8	41.4	38.6	40.7	42.3
DESIGN MAXIMUM	40.8	41.0	42.6	40.7	41.9	43.5	40.8	42.8	44.4
			44.7			45.6			46.5

EIGHT SIZE SYSTEM (SD=1.18 IN.)

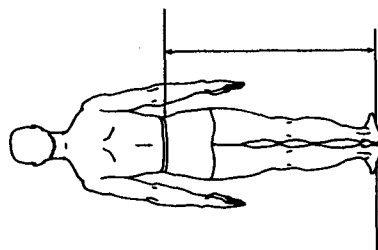
DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	36.8	38.8	40.1	37.8	39.7	41.1	38.7	40.7	42.0	39.7	41.7	43.0
DESIGN MAXIMUM	40.8		42.1	41.7	43.0	44.0	40.7	42.6	44.6	41.6	43.6	44.9
			44.1		45.0				45.9	43.6		46.9

TWELVE SIZE SYSTEM (SD= .95 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	36.7	38.9	41.1	37.6	39.8	42.0	38.6	40.8	43.0	39.5	41.7	43.9
DESIGN MAXIMUM	39.8	40.4	42.7	39.2	41.4	43.6	40.1	42.3	44.5	41.1	43.3	45.5
		42.0	44.2	40.8	43.0	45.2	41.7	43.9	46.1	42.6	44.8	47.0

⑩ ILIOCRISTALE HEIGHT

SUBJECT STANDS ERECT. USING THE ANTHROPOMETER, MEASURE THE VERTICAL DISTANCE FROM THE STANDING SURFACE TO THE ILIOCRISTALE LANDMARK.



MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
42.97	1.89	4.4%	38.5	39.8	40.5	41.7	42.9	44.3	45.5	46.2	47.5

FOUR SIZE SYSTEM (SD=1.50 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	38.2	39.7	41.2	42.7
DESIGN MAXIMUM	40.7	42.2	43.7	45.2
	43.2	44.7	46.2	47.6

SIX SIZE SYSTEM (SD=1.26 IN.)

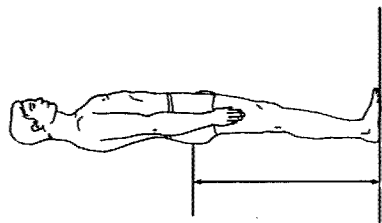
DESIGN MINIMUM	SMALL	REGULAR	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG
SIZE MEAN	37.8	39.0	40.2	41.0	42.0	43.0	44.0	45.0	46.0	47.0
DESIGN MAXIMUM	40.9	42.3	43.7	45.1	46.5	47.9	49.3	50.7	52.1	53.5

EIGHT SIZE SYSTEM (SD=1.18 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL	LONG	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	37.7	39.7	40.8	42.8	43.9	45.9	47.0	48.0	49.0	50.0	51.0	52.0	53.0	54.0	55.0	56.0
DESIGN MAXIMUM	41.6	43.6	44.7	46.7	47.8	48.9	50.0	51.0	52.0	53.0	54.0	55.0	56.0	57.0	58.0	59.0

TWELVE SIZE SYSTEM (SD=.97 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL	LONG	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	37.5	39.5	40.6	42.6	43.7	45.7	46.8	47.9	48.9	50.0	51.0	52.0	53.0	54.0	55.0	56.0
DESIGN MAXIMUM	40.8	42.8	43.9	45.9	47.0	48.0	49.0	50.0	51.0	52.0	53.0	54.0	55.0	56.0	57.0	58.0



(11) BUTTOCK HEIGHT

SUBJECT STANDS ERECT. USING AN ANTHROPOMETER, MEASURE THE VERTICAL DISTANCE FROM THE STANDING SURFACE TO THE BUTTOCK LANDMARK.

MEAN	SD	CV	1%	5%	10%	25%	TOTAL SAMPLE	50%	75%	90%	95%	99%
35.47	1.73	4.9%	31.5	32.6	33.2	34.3	35.4	36.6	37.8	38.5	39.8	

FOUR SIZE SYSTEM (SD=1.44 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 31.2 33.6 36.0	MEDIUM 32.4 34.8 37.2	LARGE 33.7 36.0 38.4	EXTRA LARGE 34.9 37.3 39.6
---	-------------------------------	--------------------------------	-------------------------------	-------------------------------------

SIX SIZE SYSTEM (SD=1.23 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 30.8 32.8 34.8	REGULAR 31.7 33.7 35.8	MEDIUM 32.6 34.6 36.6	LONG 33.5 35.5 37.5	SMALL LONG 34.4 36.4 38.4	MEDIUM LONG 35.3 37.3 39.3	LARGE 36.2 38.2 40.2	LONG 37.1 39.1 41.1
---	-------------------------------	---------------------------------	--------------------------------	------------------------------	------------------------------------	-------------------------------------	-------------------------------	------------------------------

EIGHT SIZE SYSTEM (SD=1.17 IN.)

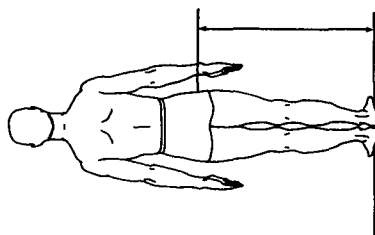
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 30.7 32.7 34.6	REGULAR 31.6 33.6 35.5	MEDIUM 32.5 34.5 36.4	LONG 33.4 35.4 37.4	SMALL LONG 34.3 36.3 38.3	MEDIUM LONG 35.2 37.2 39.2	LARGE 36.1 38.1 40.1	LONG 37.0 39.0 41.0	SMALL X-LARGE 37.9 39.9 41.9	MEDIUM X-LARGE 38.8 40.8 42.8	LONG X-LARGE 39.7 41.7 43.7
---	-------------------------------	---------------------------------	--------------------------------	------------------------------	------------------------------------	-------------------------------------	-------------------------------	------------------------------	---------------------------------------	--	--------------------------------------

TWELVE SIZE SYSTEM (SD=1.01 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 30.5 32.2 33.9	REGULAR 31.4 33.1 34.8	MEDIUM 32.3 34.0 35.7	LONG 33.2 34.9 36.6	SMALL LONG 34.1 35.8 37.5	MEDIUM LONG 35.0 36.7 38.4	LARGE 35.9 37.6 39.3	LONG 36.8 38.5 40.2	SMALL X-LARGE 37.7 39.4 41.1	MEDIUM X-LARGE 38.6 40.3 42.0	LONG X-LARGE 39.5 41.2 42.9
---	-------------------------------	---------------------------------	--------------------------------	------------------------------	------------------------------------	-------------------------------------	-------------------------------	------------------------------	---------------------------------------	--	--------------------------------------

⑫ HIP (TROCHANTERIC) HEIGHT

SUBJECT STANDS ERECT. USING THE ANTHROPOMETER, MEASURE THE VERTICAL DISTANCE FROM THE STANDING SURFACE TO THE TROCHANTERION LANDMARK ON THE RIGHT THIGH.



MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
36.99	1.71	4.6%	33.0	34.1	34.8	35.8	37.0	38.2	39.3	39.9	41.2

FOUR SIZE SYSTEM (SD=1.44 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	32.8	34.0	35.2	36.3
DESIGN MAXIMUM	35.2	36.3	37.5	38.7
	37.5	38.7	39.9	41.1

SIX SIZE SYSTEM (SD=1.22 IN.)

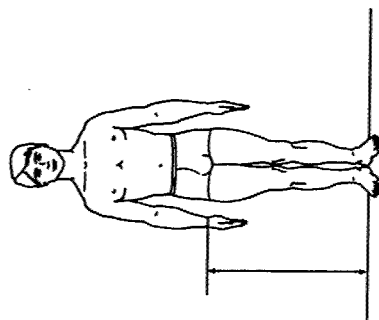
DESIGN MINIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG
SIZE MEAN	32.3	35.5	33.2	36.4	34.0	37.2
DESIGN MAXIMUM	34.3	37.5	35.2	38.4	36.0	39.2
	36.3	39.5	37.2	40.4	38.0	41.2

EIGHT SIZE SYSTEM (SD=1.15 IN.)

DESIGN MINIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG	X-LARGE REGULAR	X-LARGE LONG
SIZE MEAN	32.3	35.2	33.2	36.1	34.0	36.9	34.9	37.8
DESIGN MAXIMUM	34.2	37.1	35.1	38.0	35.9	38.8	36.8	39.7
	36.1	39.0	37.0	39.8	37.8	40.7	38.7	41.6

TWELVE SIZE SYSTEM (SD= .96 IN.)

DESIGN MINIMUM	SMALL SHORT	SMALL REGULAR	SMALL LONG	MEDIUM SHORT	MEDIUM REGULAR	MEDIUM LONG	LARGE SHORT	LARGE REGULAR	LARGE LONG	X-LARGE SHORT	X-LARGE REGULAR	X-LARGE LONG
SIZE MEAN	32.1	34.1	36.0	33.0	34.9	36.8	33.9	35.8	37.7	34.7	36.6	38.6
DESIGN MAXIMUM	33.7	35.6	37.6	34.6	36.5	38.4	35.4	37.4	39.3	36.3	38.2	40.2
	35.3	37.2	39.2	36.2	38.1	40.0	37.0	39.0	40.9	37.9	39.8	41.8



⑬ WRIST (STYLION) HEIGHT

SUBJECT STANDS ERECT, HIS ARMS HANGING NATURALLY AT HIS SIDES, USING THE ANTHRO-POMETER, MEASURE THE VERTICAL DISTANCE FROM THE STANDING SURFACE TO THE STYLION LANDMARK ON THE RIGHT WRIST.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
34.09	1.55	4.5%	30.4	31.5	32.1	33.0	34.1	35.1	36.2	36.8	37.9

FOUR SIZE SYSTEM (SD=1.25 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	30.2	31.4	32.6	33.8
DESIGN MAXIMUM	32.3	33.5	34.7	35.8
	34.3	35.5	36.7	37.9

SIX SIZE SYSTEM (SD=1.10 IN.)

DESIGN MINIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG
SIZE MEAN	29.9	32.4	30.9	33.4	31.9	34.3
DESIGN MAXIMUM	31.7	34.2	32.7	35.2	33.7	36.2
	33.5	36.0	34.5	37.0	35.5	38.0

EIGHT SIZE SYSTEM (SD=1.05 IN.)

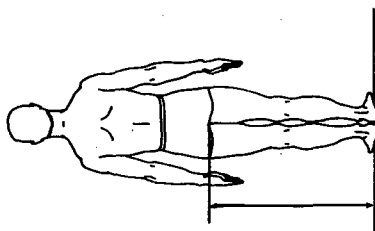
DESIGN MINIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG	X-LARGE REGULAR	X-LARGE LONG
SIZE MEAN	29.8	32.0	30.7	33.0	31.7	33.9	32.6	34.8
DESIGN MAXIMUM	31.5	33.8	32.5	34.7	33.4	35.6	34.3	36.6
	33.3	35.5	34.2	36.4	35.1	37.4	36.1	38.3

TWELVE SIZE SYSTEM (SD=.94 IN.)

DESIGN MINIMUM	SMALL SHORT	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG	X-LARGE SHORT	X-LARGE REGULAR	X-LARGE LONG
SIZE MEAN	29.6	32.6	30.5	33.5	32.5	34.5	32.4	33.9	35.4
DESIGN MAXIMUM	31.1	34.1	32.1	35.1	33.0	36.0	34.0	35.5	37.0
	32.7	35.7	33.6	36.6	34.6	37.6	35.5	37.0	38.5

⑭ CROTCH HEIGHT (INSEAM)

SUBJECT STANDS ERECT, HIS FEET APPROXIMATELY EIGHT INCHES APART. HOLD THE ANTHRO-
POMETER VERTICALLY IN FRONT OF THE SUBJECT AND RAISE THE INSTRUMENT ARM BETWEEN
THE SCROTUM AND THE RIGHT LEG. HAVE THE SUBJECT BRING HIS HEELS TOGETHER AND
RAISE THE INSTRUMENT ARM UNTIL IT FIRMLY PRESSES AGAINST THE FLESH OF THE MIDPOINT
OF THE CROTCH. RECORD THE INDICATED DISTANCE ABOVE THE STANDING SURFACE.



MEAN	SD	CV	1%	5%	TOTAL SAMPLE					90%	95%	99%
					10%	25%	50%	75%	90%			
33.49	1.63	4.9%	29.7	30.8	31.4	32.4	33.5	34.6	35.7	36.3	37.4	

FOUR SIZE SYSTEM (SD=1.42 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			EXTRA LARGE		
	REGULAR	SMALL	LONG	REGULAR	SMALL	LONG	REGULAR	SMALL	LONG	REGULAR	SMALL	LONG
	29.1	29.6	30.6	30.6	31.6	32.6	32.6	33.6	34.6	35.0	35.0	37.3
	31.1	31.9	32.9	32.9	33.9	35.0	35.0	36.3	37.3	38.3	39.3	41.6
	33.1	34.3	35.3	35.3	36.3	37.3	38.3	39.3	40.3	41.3	42.3	44.6

SIX SIZE SYSTEM (SD=1.21 IN.)

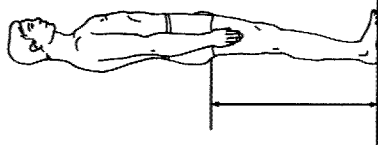
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		X-LARGE		XX-LARGE	
	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL
	29.1	29.6	30.6	31.6	32.6	33.6	34.6	35.6	36.6	37.6
	31.1	31.9	32.9	33.9	34.9	35.9	36.9	37.9	38.9	39.9
	33.1	34.1	35.1	36.1	37.1	38.1	39.1	40.1	41.1	42.1

EIGHT SIZE SYSTEM (SD=1.15 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		X-LARGE		XX-LARGE		XXX-LARGE	
	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL
	29.1	29.6	30.6	31.6	32.6	33.6	34.6	35.6	36.6	37.6	38.6	39.6
	31.0	31.7	32.7	33.7	34.7	35.7	36.7	37.7	38.7	39.7	40.7	41.7
	32.9	33.6	34.6	35.6	36.6	37.6	38.6	39.6	40.6	41.6	42.6	43.6

TWELVE SIZE SYSTEM (SD= .98 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		X-LARGE		XX-LARGE		XXX-LARGE	
	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL
	28.9	29.6	30.6	31.6	32.6	33.6	34.6	35.6	36.6	37.6	38.6	39.6
	30.5	31.2	32.2	33.2	34.2	35.2	36.2	37.2	38.2	39.2	40.2	41.2
	32.2	32.9	33.9	34.9	35.9	36.9	37.9	38.9	39.9	40.9	41.9	42.9



⑮ GLUTEAL FURROW HEIGHT

SUBJECT STANDS ERECT, USING AN ANTHROPOMETER, MEASURE THE VERTICAL DISTANCE FROM THE STANDING SURFACE TO THE LOWEST POINT ON THE RIGHT GLUTEAL FURROW.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
31.94	1.58	4.9%	28.1	29.3	29.9	30.8	31.9	33.0	34.0	34.6	35.8

FOUR SIZE SYSTEM (SD=1.34 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 28.1 30.3 32.5	MEDIUM 29.1 31.4 33.6	LARGE 30.2 32.4 34.6	EXTRA LARGE 31.3 33.5 35.7
---	-------------------------------	--------------------------------	-------------------------------	-------------------------------------

SIX SIZE SYSTEM (SD=1.13 IN.)

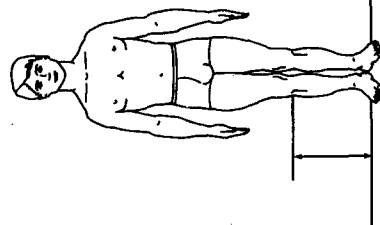
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 27.6 29.5 31.4	REGULAR 28.6 30.5 32.4	MEDIUM 29.6 31.5 33.4	LONG 30.6 32.5 34.3	MEDIUM LONG 31.3 33.2 35.1	LARGE 32.1 34.0 35.8	LARGE LONG 32.1 34.0 35.8
---	-------------------------------	---------------------------------	--------------------------------	------------------------------	-------------------------------------	-------------------------------	------------------------------------

EIGHT SIZE SYSTEM (SD=1.07 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 27.6 29.4 31.2	REGULAR 29.2 31.0 32.8	MEDIUM 30.2 32.0 33.8	LONG 31.2 33.0 34.8	MEDIUM LONG 32.2 34.0 35.8	LARGE 33.2 35.0 36.8	LARGE LONG 34.2 36.0 37.8	REGULAR 30.0 31.8 33.6	REGULAR 31.0 32.8 34.6	REGULAR 32.0 33.8 35.6	X-LARGE 33.0 34.8 36.6	X-LARGE LONG 34.0 35.8 37.6
---	-------------------------------	---------------------------------	--------------------------------	------------------------------	-------------------------------------	-------------------------------	------------------------------------	---------------------------------	---------------------------------	---------------------------------	---------------------------------	--------------------------------------

TWELVE SIZE SYSTEM (SD= .91 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 27.5 29.0 30.5	REGULAR 29.2 30.7 32.2	MEDIUM 30.2 31.7 33.2	LONG 31.2 32.7 34.2	MEDIUM LONG 32.2 33.7 35.2	LARGE 33.2 34.7 36.2	LARGE LONG 34.2 35.7 37.2	REGULAR 30.0 31.5 33.0	REGULAR 31.0 32.5 34.0	REGULAR 32.0 33.5 35.0	X-LARGE 33.0 34.5 36.0	X-LARGE LONG 34.0 35.5 37.0
---	-------------------------------	---------------------------------	--------------------------------	------------------------------	-------------------------------------	-------------------------------	------------------------------------	---------------------------------	---------------------------------	---------------------------------	---------------------------------	--------------------------------------



⑩ KNEE (FIBULAR) HEIGHT

SUBJECT STANDS ERECT, USING THE ANTHROPOMETER, MEASURE THE VERTICAL DISTANCE FROM THE STANDING SURFACE TO THE LANDMARK INDICATING THE TOP OF THE FIBULA AS DETERMINED BY PALPATION.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
17.27	.89	5.1%	15.1	15.7	16.0	16.6	17.2	17.9	18.6	18.9	19.5

FOUR SIZE SYSTEM (SD= .75 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
	15.1 16.3 17.6	15.7 16.9 18.2	16.3 17.6 18.8	16.9 18.2 19.4

SIX SIZE SYSTEM (SD= .65 IN.)

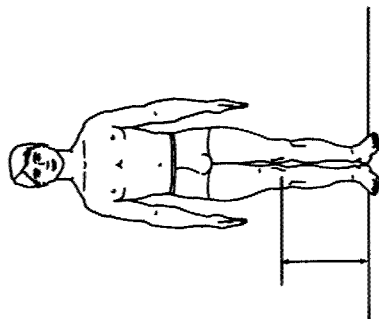
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG
	14.9 15.9 17.0	16.4 17.5 18.6	15.3 16.4 17.5	16.9 17.9 19.0	15.8 16.8 17.9	17.3 18.4 19.5

EIGHT SIZE SYSTEM (SD= .62 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG	X-LARGE REGULAR	X-LARGE LONG
	14.8 15.9 16.9	16.2 17.3 18.3	15.3 16.3 17.3	16.7 17.7 18.7	15.8 16.8 17.8	17.1 18.2 19.2	16.2 17.2 18.3	17.6 18.6 19.6

TWELVE SIZE SYSTEM (SD= .54 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL SHORT	SMALL REGULAR	SMALL LONG	MEDIUM SHORT	MEDIUM REGULAR	MEDIUM LONG	LARGE SHORT	LARGE REGULAR	LARGE LONG	X-LARGE SHORT	X-LARGE REGULAR	X-LARGE LONG
	14.7 15.6 16.5	15.7 16.6 17.5	16.6 17.5 18.4	15.2 16.1 17.0	16.1 17.0 17.9	17.1 18.0 18.8	15.6 16.5 17.4	16.6 17.5 18.4	17.5 18.4 19.3	16.1 17.0 17.9	17.0 17.9 18.8	18.0 18.9 19.8



⑪ KNEE CIRCUMFERENCE HEIGHT

SUBJECT STANDS ERECT. USING THE ANTHROPOMETER, MEASURE THE VERTICAL DISTANCE FROM THE FLOOR TO THE KNEE LANDMARK INDICATING THE MIDDLE OF THE RIGHT PATELLA.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
19.55	.98	5.0%	17.2	17.8	18.2	18.8	19.5	20.2	20.9	21.3	22.1

FOUR SIZE SYSTEM (SD= .81 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	17.1	17.8	18.5	19.2
DESIGN MAXIMUM	18.5	19.2	19.9	20.6
	19.8	20.5	21.2	21.9

SIX SIZE SYSTEM (SD= .70 IN.)

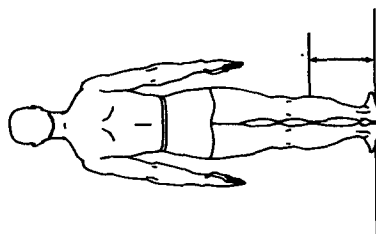
DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
SIZE MEAN	16.9	18.4	18.6	17.4	18.6	19.1	18.0	19.1	19.7
DESIGN MAXIMUM	18.0	19.5	19.8	18.5	19.7	20.3	19.5	20.6	20.8
	19.1	20.6	20.9	20.0	21.1	21.5	20.3	21.7	22.0

EIGHT SIZE SYSTEM (SD= .67 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	16.8	18.0	18.4	17.4	18.9	19.0	17.9	19.5	19.5	18.4	19.4	20.0
DESIGN MAXIMUM	17.7	18.7	19.5	18.5	20.0	20.6	19.0	20.6	20.7	19.5	20.3	21.1
	18.7	19.7	20.6	19.6	21.1	21.7	20.1	21.7	22.2	20.7	21.3	22.2

TWELVE SIZE SYSTEM (SD= .58 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	16.7	17.8	18.8	17.3	18.3	19.3	17.8	18.8	19.9	18.3	19.4	20.4
DESIGN MAXIMUM	17.7	18.7	19.7	18.2	19.3	20.3	18.8	19.8	20.8	19.3	20.3	21.3
	18.7	19.7	20.7	19.2	20.2	21.2	19.7	20.7	21.8	20.3	21.3	22.3



18 CALF HEIGHT

SUBJECT STANDS ERECT. USING THE ANTHROMETER, MEASURE THE VERTICAL DISTANCE FROM THE STANDING SURFACE TO THE LANDMARK INDICATING THE MAXIMUM CIRCUMFERENCE OF THE RIGHT CALF.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
14.00	.88	6.3%	11.8	12.4	12.8	13.3	14.0	14.6	15.2	15.6	16.3

FOUR SIZE SYSTEM (SD= .76 IN.)

	SMALL	MEDIUM	LARGE	EXTRA LARGE
DESIGN MINIMUM	11.9	12.4	13.0	13.6
SIZE MEAN	13.1	13.7	14.3	14.8
DESIGN MAXIMUM	14.4	15.0	15.5	16.1

SIX SIZE SYSTEM (SD= .69 IN.)

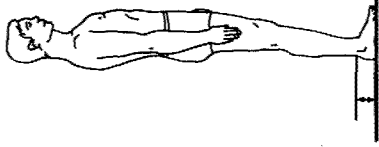
	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
DESIGN MINIMUM	11.6	12.7	13.0	12.1	13.3	13.4	12.5	13.7	13.9
SIZE MEAN	12.8	13.9	14.1	13.2	14.4	14.6	13.7	14.8	15.0
DESIGN MAXIMUM	13.9	15.1	15.3	14.4	15.5	15.7	14.8	15.9	16.1

EIGHT SIZE SYSTEM (SD= .67 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	11.5	12.6	12.8	12.1	13.2	13.5	12.5	13.7	12.9	14.1	15.2	16.3
SIZE MEAN	12.8	13.9	14.1	13.2	14.4	14.6	13.7	14.8	14.0	15.2	16.3	
DESIGN MAXIMUM	13.9	15.1	15.3	14.4	15.5	15.7	14.8	15.9	15.1	16.3		

TWELVE SIZE SYSTEM (SD= .62 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	SHORT	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	11.5	12.6	13.1	11.9	12.7	13.5	12.4	13.2	14.0	14.8	15.6	16.4	17.2	18.0
SIZE MEAN	12.8	13.9	14.1	13.0	13.8	14.6	13.4	14.2	15.0	15.8	16.6	17.4	18.2	19.0
DESIGN MAXIMUM	13.6	14.4	15.2	14.0	14.8	15.6	14.4	15.2	16.0	16.8	17.6	18.4	19.2	20.0



19 ANKLE HEIGHT

SUBJECT STANDS WITH HIS RIGHT FOOT SLIGHTLY FORWARD AND HIS WEIGHT EQUALLY DISTRIBUTED ON BOTH FEET. TOUCH THE MEASURING-BLOCK SCALE AGAINST THE LATERAL SIDE OF THE FOOT AND MEASURE THE HEIGHT OF THE LANDMARK INDICATING THE MINIMUM CIRCUMFERENCE OF THE RIGHT ANKLE.

MEAN	SD	CV	1X	5%	10%	25%	50%	75%	90%	95%	99%
5.40	.45	8.4%	4.4	4.6	4.7	4.9	5.3	5.9	6.3	6.4	6.6

FOUR SIZE SYSTEM (SD= .43 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	4.4	4.6	4.8	4.9
DESIGN MAXIMUM	5.2	5.3	5.5	5.6
	5.9	6.0	6.2	6.3

SIX SIZE SYSTEM (SD= .42 IN.)

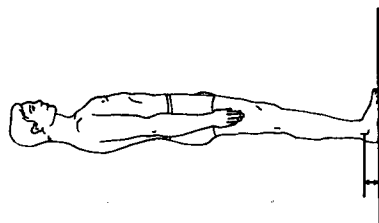
DESIGN MINIMUM	SMALL	REGULAR	MEDIUM	REGULAR	LARGE	REGULAR	LARGE	LONG
SIZE MEAN	4.3	4.7	5.0	5.1	5.4	5.6	5.9	5.0
DESIGN MAXIMUM	5.7	6.1	6.2	6.3	6.4	6.5	6.6	6.7

EIGHT SIZE SYSTEM (SD= .42 IN.)

DESIGN MINIMUM	SMALL	REGULAR	MEDIUM	REGULAR	LARGE	REGULAR	LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	4.3	4.7	5.0	5.1	5.4	5.6	5.9	6.0	6.1	6.2
DESIGN MAXIMUM	5.7	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9

TWELVE SIZE SYSTEM (SD= .41 IN.)

DESIGN MINIMUM	SMALL	REGULAR	MEDIUM	REGULAR	LARGE	REGULAR	LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	4.3	4.6	4.9	5.0	5.3	5.4	5.7	5.8	6.0	6.1
DESIGN MAXIMUM	5.6	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7



20 LATERAL MALLEOLUS HEIGHT

SUBJECT STANDS, WITH HIS RIGHT FOOT SLIGHTLY FORWARD, AND HIS WEIGHT EQUALLY DISTRIBUTED ON BOTH FEET. TOUCH THE EDGE OF THE MEASURING-BLOCK SCALE AGAINST THE LATERAL MALLEOLUS OF THE RIGHT FOOT AND MEASURE THE HEIGHT OF ITS MOST PROJECTING POINT.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
2.77	.21	7.7%	1.6	2.1	2.5	2.7	3.0	3.2	3.4	3.4	3.5

FOUR SIZE SYSTEM (SD= .20 IN.)

	SMALL	MEDIUM	LARGE	EXTRA LARGE
DESIGN MINIMUM	2.3	2.4	2.5	2.6
SIZE MEAN	2.6	2.7	2.8	2.9
DESIGN MAXIMUM	2.9	3.0	3.1	3.3

SIX SIZE SYSTEM (SD= .19 IN.)

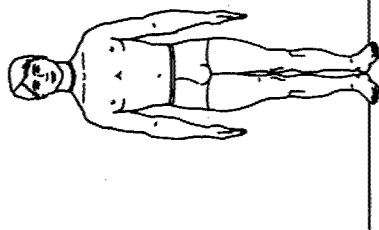
	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
DESIGN MINIMUM	2.3	2.4	2.4	2.5	2.6	2.7	2.8	2.9	3.0
SIZE MEAN	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4
DESIGN MAXIMUM	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7

EIGHT SIZE SYSTEM (SD= .19 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	2.3	2.4	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3
SIZE MEAN	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7
DESIGN MAXIMUM	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0

TWELVE SIZE SYSTEM (SD= .19 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	2.2	2.3	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2
SIZE MEAN	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6
DESIGN MAXIMUM	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0



21) NECK CIRCUMFERENCE, MAXIMUM

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFORT PLANE. HOLDING THE TAPE PERPENDICULAR TO THE LONG AXIS OF THE NECK, MEASURE THE MAXIMUM CIRCUMFERENCE OF THE NECK, INCLUDING THE ADAM'S APPLE.

MEAN	SD	CV	1%	5%	TOTAL SAMPLE				90%	95%	99%
					5%	10%	25%	50%			
15.10	.75	5.0%	13.5	13.8	14.0	14.5	15.1	15.6	16.2	16.5	17.3

FOUR SIZE SYSTEM (SD= .57 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			EXTRA LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	13.3	13.3	13.3	13.9	13.9	13.9	14.5	14.5	14.5	15.1	15.1	15.1
	14.3	14.3	14.3	14.9	14.9	14.9	15.4	15.4	15.4	16.0	16.0	16.0
	15.2	15.2	15.2	15.8	15.8	15.8	16.4	16.4	16.4	16.9	16.9	16.9

SIX SIZE SYSTEM (SD= .58 IN.)

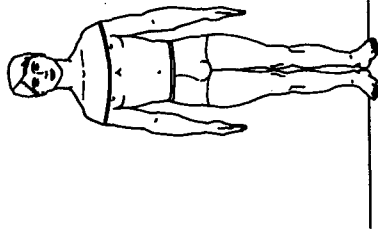
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			REGULAR			MEDIUM			LONG			LARGE			REGULAR			LARGE			LONG		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	13.6	13.6	13.6	14.3	14.3	14.3	14.3	14.3	14.3	14.0	14.0	14.0	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	14.8	14.8	14.8
	14.6	14.6	14.6	15.3	15.3	15.3	15.3	15.3	15.3	15.0	15.0	15.0	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	15.7	15.7	15.7
	15.5	15.5	15.5	16.2	16.2	16.2	16.3	16.3	16.3	16.0	16.0	16.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	16.7	16.7	16.7

EIGHT SIZE SYSTEM (SD= .56 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			REGULAR			MEDIUM			LONG			LARGE			REGULAR			LONG			X-LARGE			REGULAR			X-LARGE			LONG		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM			
	13.4	13.4	13.4	14.1	14.1	14.1	14.0	14.0	14.0	13.8	13.8	13.8	14.6	14.6	14.6	14.4	14.4	14.4	14.4	14.4	14.4	15.2	15.2	15.2	15.0	15.0	15.0	15.2	15.2	15.0			
	14.4	14.4	14.4	15.1	15.1	15.1	15.0	15.0	15.0	14.7	14.7	14.7	15.6	15.6	15.6	15.3	15.3	15.3	15.3	15.3	15.3	16.2	16.2	16.2	15.9	15.9	15.9	16.2	16.2	15.9			
	15.3	15.3	15.3	16.0	16.0	16.0	15.9	15.9	15.9	15.6	15.6	15.6	16.5	16.5	16.5	16.2	16.2	16.2	16.2	16.2	16.2	17.1	17.1	17.1	16.8	16.8	16.8	17.1	17.1	16.8			

TWELVE SIZE SYSTEM (SD= .56 IN.)

	SMALL		SMALL		MEDIUM		MEDIUM		MEDIUM		LARGE		LARGE		LARGE		X-LARGE		X-LARGE		X-LARGE	
	SHORT	REGULAR	LONG	REGULAR	SHORT	REGULAR	LONG	REGULAR	SHORT	REGULAR	SHORT	REGULAR	SHORT	REGULAR	SHORT	REGULAR	SHORT	REGULAR	SHORT	REGULAR	LONG	
DESIGN MINIMUM	13.5	13.3	13.1	13.9	14.1	13.9	13.7	14.7	14.7	14.7	14.7	14.5	15.3	15.3	15.3	15.1	14.9	14.9	14.9	14.9	14.9	
SIZE MEAN	14.4	14.2	14.0	14.2	15.0	14.2	14.6	15.6	15.6	15.6	15.6	15.4	15.6	15.6	16.2	16.0	15.9	15.9	15.9	15.9	15.9	
DESIGN MAXIMUM	15.3	15.1	15.0	15.7	15.9	15.7	15.6	16.5	16.5	16.5	16.5	16.4	17.1	17.1	17.1	17.0	16.8	16.8	16.8	16.8	16.8	



22) SHOULDER CIRCUMFERENCE

SUBJECT STANDS ERECT, HOLDING THE TAPE IN A HORIZONTAL PLANE, MEASURE THE MAXIMUM CIRCUMFERENCE OF THE SHOULDERS AT THE LEVEL OF THE GREATEST LATERAL PROTRUSION OF THE DELTOID MUSCLES.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
46.34	2.29	4.9%	40.9	42.6	43.5	44.8	46.3	47.9	49.4	50.3	52.0

FOUR SIZE SYSTEM (SD=1.45 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
	40.9 43.3 45.6	43.0 45.4 47.8	45.2 47.6 49.9	47.3 49.7 52.1

SIX SIZE SYSTEM (SD=1.51 IN.)

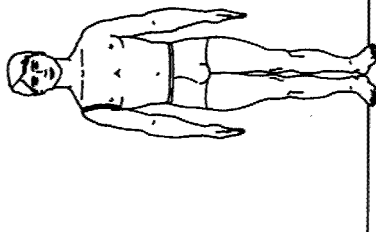
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG
	41.7 44.2 46.7	41.0 43.5 46.0	44.4 46.9 49.4	43.7 46.2 48.7	47.1 49.6 52.1	46.4 48.9 51.4

EIGHT SIZE SYSTEM (SD=1.42 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG	X-LARGE REGULAR	X-LARGE LONG
	41.1 43.4 45.8	40.5 42.8 45.1	43.3 45.6 48.0	42.7 45.0 47.4	45.5 47.9 50.2	44.9 47.2 49.6	47.7 50.1 52.4	47.1 49.4 51.8

TWELVE SIZE SYSTEM (SD=1.41 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL SHORT	SMALL REGULAR	SMALL LONG	MEDIUM SHORT	MEDIUM REGULAR	MEDIUM LONG	LARGE SHORT	LARGE REGULAR	LARGE LONG	X-LARGE SHORT	X-LARGE REGULAR	X-LARGE LONG
	41.2 43.5 45.9	40.8 43.1 45.4	40.4 42.7 45.0	43.4 45.7 48.1	43.0 45.3 47.7	42.6 44.9 47.2	45.6 48.0 50.3	45.2 47.5 49.9	44.8 47.1 49.5	47.9 50.2 52.5	47.4 49.8 52.1	47.0 49.3 51.7



23 SCYE CIRCUMFERENCE

SUBJECT STANDS, HIS RIGHT ARM INITIALLY RAISED, AND THEN LOWERED AFTER THE TAPE IS IN PLACE. MEASURE THE CIRCUMFERENCE OF THE SCYE WITH THE TAPE PLACED AS HIGH AS POSSIBLE IN THE RIGHT ARMPIT AND PASSING VERTICALLY OVER THE SHOULDER.

MEAN	SD	CV	1X	TOTAL SAMPLE					90%	95%	99%
				5%	10%	25%	50%	75%			
19.04	1.10	5.8%	16.5	17.1	17.5	18.2	19.0	19.8	20.5	21.0	21.9

FOUR SIZE SYSTEM (SD= .79 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			EXTRA LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	16.4	17.7	19.0	17.3	18.6	19.9	18.3	19.6	20.9	19.2	20.5	21.8

SIX SIZE SYSTEM (SD= .81 IN.)

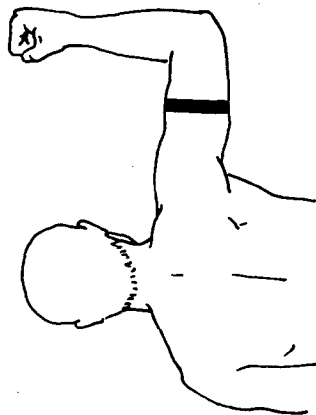
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE			XX-LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	16.4	17.7	19.0	17.3	18.6	19.9	18.3	19.6	20.9	19.2	20.5	21.8	20.5	21.8	23.1

EIGHT SIZE SYSTEM (SD= .78 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE			XX-LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	16.4	17.7	19.0	17.3	18.6	19.9	18.3	19.6	20.9	19.2	20.5	21.8	20.5	21.8	23.1

TWELVE SIZE SYSTEM (SD= .78 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE			XX-LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	16.4	17.7	19.0	17.3	18.6	19.9	18.3	19.6	20.9	19.2	20.5	21.8	20.5	21.8	23.1



24) BICEPS CIRCUMFERENCE, FLEXED

SUBJECT BENDS HIS RIGHT ARM TO ABOUT A RIGHT ANGLE AND MAKES A FIST WHILE HOLDING THE UPPER ARM HORIZONTALLY. USING THE TAPE, MEASURE THE CIRCUMFERENCE OF THE ARM AT THE BICEPS CIRCUMFERENCE LANDMARK.

MEAN	SD	CV	TOTAL SAMPLE					90%	95%	99%
			5%	10%	25%	50%	75%			
12.69	.89	6.9%	10.6	11.2	11.6	12.2	12.9	14.2	14.5	15.3

FOUR SIZE SYSTEM (SD= .62 IN.)

DESIGN MINIMUM		SMALL		MEDIUM		LARGE		EXTRA LARGE	
SIZE MEAN	DESIGN MAXIMUM	SMALL LONG	SMALL REGULAR	MEDIUM LONG	MEDIUM REGULAR	LARGE LONG	LARGE REGULAR	EXTRA LARGE LONG	EXTRA LARGE REGULAR
11.2	13.3	10.7	11.2	12.2	13.3	13.2	14.3	13.1	14.1
12.3		11.7	12.3	13.3	14.3	14.3	15.3	14.1	15.1
13.3		12.8	14.3	14.3					

SIX SIZE SYSTEM (SD= .63 IN.)

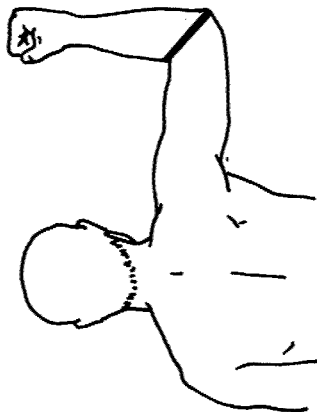
DESIGN MINIMUM		SMALL LONG		MEDIUM LONG		LARGE LONG		X-LARGE LONG	
SIZE MEAN	DESIGN MAXIMUM	SMALL LONG	SMALL REGULAR	MEDIUM LONG	MEDIUM REGULAR	LARGE LONG	LARGE REGULAR	X-LARGE LONG	X-LARGE REGULAR
11.0	13.3	10.5	11.0	12.0	13.0	13.2	14.3	15.4	16.5
12.0		11.5	12.0	13.0	14.0	14.3	15.3	16.4	17.5
13.0		12.5	13.0	14.0	15.0	15.3	16.3	17.4	18.5

EIGHT SIZE SYSTEM (SD= .59 IN.)

DESIGN MINIMUM		SMALL LONG		MEDIUM LONG		LARGE LONG		X-LARGE LONG	
SIZE MEAN	DESIGN MAXIMUM	SMALL LONG	SMALL REGULAR	MEDIUM LONG	MEDIUM REGULAR	LARGE LONG	LARGE REGULAR	X-LARGE LONG	X-LARGE REGULAR
11.0	13.0	10.5	11.0	12.0	13.0	13.2	14.3	15.4	16.5
12.0		11.5	12.0	13.0	14.0	14.3	15.3	16.4	17.5
13.0		12.5	13.0	14.0	15.0	15.3	16.3	17.4	18.5

TWELVE SIZE SYSTEM (SD= .58 IN.)

DESIGN MINIMUM		SMALL LONG		MEDIUM LONG		LARGE LONG		X-LARGE LONG	
SIZE MEAN	DESIGN MAXIMUM	SMALL LONG	SMALL REGULAR	MEDIUM LONG	MEDIUM REGULAR	LARGE LONG	LARGE REGULAR	X-LARGE LONG	X-LARGE REGULAR
11.0	13.0	10.5	11.0	12.0	13.0	13.2	14.3	15.4	16.5
12.0		11.5	12.0	13.0	14.0	14.3	15.3	16.4	17.5
13.0		12.5	13.0	14.0	15.0	15.3	16.3	17.4	18.5



25 ELBOW CIRCUMFERENCE, FLEXED

SUBJECT BENDS HIS RIGHT ARM TO ABOUT A RIGHT ANGLE AND MAKES A FIST WHILE HOLDING THE UPPER ARM HORIZONTALLY, WITH THE TAPE PASSING OVER THE TIP AND THROUGH THE CROTCH OF THE ELBOW, MEASURE THE CIRCUMFERENCE OF THE ELBOW.

MEAN	SD	CV	1%	5%	TOTAL SAMPLE					90%	95%	99%
					10%	25%	50%	75%	90%			
12.30	.69	5.6%	10.5	11.0	11.2	11.7	12.3	12.6	13.3	13.6	14.3	

FOUR SIZE SYSTEM (SD= .56 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			EXTRA LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	10.6	11.1	11.6	11.6	12.1	12.6	12.6	13.1	13.6	13.1	13.6	14.0

SIX SIZE SYSTEM (SD= .57 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	10.6	11.1	11.6	11.6	12.1	12.6	12.6	13.1	13.6	13.1	13.6	14.0

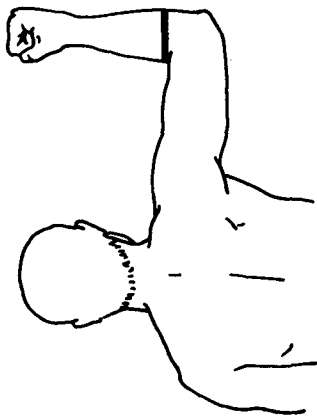
EIGHT SIZE SYSTEM (SD= .56 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	10.6	11.1	11.6	11.6	12.1	12.6	12.6	13.1	13.6	13.1	13.6	14.0

TWELVE SIZE SYSTEM (SD= .56 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	10.6	11.1	11.6	11.6	12.1	12.6	12.6	13.1	13.6	13.1	13.6	14.0

26 LOWER ARM CIRCUMFERENCE, FLEXED



SUBJECT BENDS HIS RIGHT ARM TO ABOUT A RIGHT ANGLE AND MAKES A FIST WHILE HOLDING THE UPPER ARM HORIZONTALLY. HOLDING THE TAPE IN A PLANE AT RIGHT ANGLES TO THE LONG AXIS OF THE LOWER ARM, MEASURE THE CIRCUMFERENCE OF THE LOWER ARM AT THE FORE-ARM CIRCUMFERENCE LANDMARK.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
11.72	.62	5.3%	10.1	10.6	10.8	11.2	11.7	12.2	12.7	13.0	13.5

FOUR SIZE SYSTEM (SD= .46 IN.)

	SMALL	MEDIUM	LARGE	EXTRA LARGE
DESIGN MINIMUM	10.2	10.7	11.2	11.7
SIZE MEAN	11.0	11.5	12.0	12.5
DESIGN MAXIMUM	11.8	12.3	12.8	13.3

SIX SIZE SYSTEM (SD= .47 IN.)

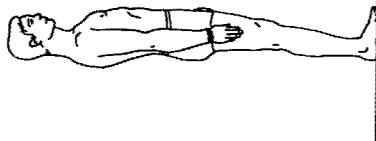
	SMALL	SMALL LONG	MEDIUM	MEDIUM LONG	LARGE	LARGE LONG
DESIGN MINIMUM	10.3	10.8	11.0	11.3	11.7	11.5
SIZE MEAN	11.0	11.1	11.4	11.7	12.0	12.3
DESIGN MAXIMUM	11.8	11.9	12.2	12.5	12.8	13.1

EIGHT SIZE SYSTEM (SD= .46 IN.)

	SMALL	SMALL LONG	MEDIUM	MEDIUM LONG	LARGE	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	10.3	10.2	10.8	10.7	11.3	11.2	11.8	11.8	11.7
SIZE MEAN	11.0	10.9	11.5	11.4	12.0	12.0	12.6	12.5	12.5
DESIGN MAXIMUM	11.8	11.7	12.3	12.2	12.8	12.7	13.3	13.2	13.2

TWELVE SIZE SYSTEM (SD= .46 IN.)

	SMALL	SMALL LONG	MEDIUM	MEDIUM LONG	LARGE	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	10.3	10.1	10.8	10.7	11.3	11.2	11.8	11.8	11.7
SIZE MEAN	11.0	10.9	11.5	11.4	12.1	12.0	12.6	12.5	12.5
DESIGN MAXIMUM	11.8	11.7	12.3	12.2	12.8	12.7	13.3	13.3	13.2



(27) WRIST CIRCUMFERENCE

SUBJECT STANDS, HIS RIGHT ELBOW EXTENDED, WITH THE HAND ABOUT 30 CM FROM THE SIDE OF THE BODY, HOLDING THE TAPE PERPENDICULAR TO THE LONG AXIS OF THE LOWER ARM, MEASURE THE CIRCUMFERENCE OF THE WRIST AT THE LEVEL OF THE WRIST CIRCUMFERENCE LANDMARK.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
6.92	.36	5.2%	5.5	6.0	6.2	6.6	7.0	7.3	7.5	7.7	8.4

FOUR SIZE SYSTEM (SD= .30 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	6.1	6.3	6.6	6.8
DESIGN MAXIMUM	6.6	6.8	7.1	7.3
	7.1	7.3	7.6	7.8

SIX SIZE SYSTEM (SD= .30 IN.)

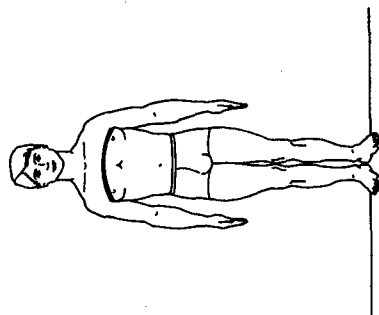
DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
SIZE MEAN	6.0	6.1	6.2	6.4	6.4	6.5	6.7	6.7	6.8
DESIGN MAXIMUM	6.5	6.6	6.7	6.9	6.9	7.0	7.2	7.2	7.3
	7.0	7.1	7.2	7.4	7.4	7.5	7.7	7.7	7.8

EIGHT SIZE SYSTEM (SD= .30 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	6.0	6.1	6.2	6.3	6.3	6.4	6.5	6.5	6.6	6.8	6.8	6.8
DESIGN MAXIMUM	6.5	6.6	6.7	6.8	6.8	6.9	7.0	7.0	7.1	7.3	7.3	7.3
	7.0	7.1	7.2	7.3	7.3	7.4	7.5	7.5	7.6	7.8	7.8	7.8

TWELVE SIZE SYSTEM (SD= .30 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	6.0	6.1	6.2	6.3	6.3	6.4	6.5	6.5	6.6	6.8	6.8	6.8
DESIGN MAXIMUM	6.5	6.6	6.7	6.8	6.8	6.9	7.0	7.0	7.1	7.3	7.3	7.3
	7.0	7.1	7.2	7.3	7.3	7.4	7.5	7.5	7.6	7.8	7.8	7.8



28 CHEST CIRCUMFERENCE AT SCYE

SUBJECT STANDS ERECT, HIS ARMS INITIALLY RAISED, THEN LOWERED AFTER THE TAPE IS IN PLACE, HOLDING THE TAPE IN A HORIZONTAL PLANE AT THE LEVEL OF THE ARM SCYE LAND-MARKS, MEASURE THE MAXIMUM CIRCUMFERENCE OF THE CHEST DURING NORMAL BREATHING.

MEAN	SD	CV	TOTAL SAMPLE					90%	95%	99%
			1%	5%	10%	25%	50%			
40.26	2.39	5.9%	34.9	36.4	37.2	38.6	40.2	41.9	44.3	46.2

FOUR SIZE SYSTEM (SD=1.57 IN.)

	SMALL	MEDIUM	LARGE	EXTRA LARGE
DESIGN MINIMUM	34.6	36.8	38.9	41.0
SIZE MEAN	37.2	39.3	41.5	43.6
DESIGN MAXIMUM	39.8	41.9	44.1	46.2

SIX SIZE SYSTEM (SD=1.53 IN.)

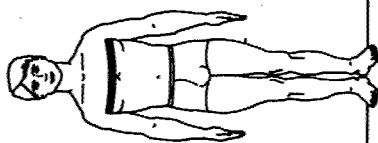
	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
DESIGN MINIMUM	34.9	35.5	34.5	36.3	37.3	38.3	41.1	43.7	46.0
SIZE MEAN	37.5	38.2	37.2	41.0	40.0	42.6	43.7	45.4	48.7
DESIGN MAXIMUM	40.0	40.9	39.9	43.7	42.6	45.4	46.4	48.7	51.4

EIGHT SIZE SYSTEM (SD=1.53 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	34.9	35.5	34.0	36.7	37.2	38.3	39.4	41.0	43.5	45.7	48.2	50.8
SIZE MEAN	37.5	38.2	36.5	39.2	39.7	40.8	42.0	43.6	45.2	46.7	48.2	50.8
DESIGN MAXIMUM	40.0	40.9	39.1	41.7	42.2	43.3	44.5	46.1	47.7	49.2	50.8	53.4

TWELVE SIZE SYSTEM (SD=1.52 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	35.1	35.5	33.9	36.7	37.4	38.1	39.6	41.5	43.4	45.3	47.2	49.1
SIZE MEAN	37.6	38.0	36.4	39.2	39.9	40.1	42.1	44.0	45.9	47.8	49.7	51.6
DESIGN MAXIMUM	40.1	39.5	38.9	41.7	42.4	41.1	44.6	46.0	47.4	48.9	50.4	51.9



29 CHEST CIRCUMFERENCE

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFORT PLANE, HIS ARMS INITIALLY RAISED, THEN LOWERED AFTER A TAPE IS IN PLACE, HOLDING THE TAPE IN A HORIZONTAL PLANE AT THE LEVEL OF THE NIPPLES, MEASURE THE MAXIMUM CIRCUMFERENCE OF THE CHEST DURING NORMAL BREATHING.

MEAN	SD	CV	TOTAL SAMPLE								
			1%	5%	10%	25%	50%	75%	90%	95%	99%
38.80	2.50	6.4%	33.3	34.8	35.6	37.0	38.7	40.4	42.1	43.1	45.1

FOUR SIZE SYSTEM (SD=1.59 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			EXTRA LARGE		
	REGULAR	SHORT	LONG	REGULAR	SHORT	LONG	REGULAR	SHORT	LONG	REGULAR	SHORT	LONG
	34.0	32.2	34.0	35.2	33.4	35.2	37.5	35.7	37.5	39.8	38.0	39.8
	36.7	34.9	36.7	37.8	36.0	37.8	40.1	38.3	40.1	42.4	40.6	42.4
	39.4	37.6	39.4	40.4	38.6	40.4	42.7	40.9	42.7	45.0	43.2	45.0

SIX SIZE SYSTEM (SD=1.64 IN.)

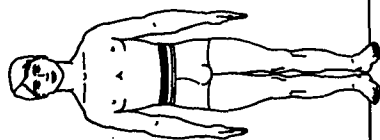
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE		
	REGULAR	SHORT	LONG	REGULAR	SHORT	LONG	REGULAR	SHORT	LONG	REGULAR	SHORT	LONG
	33.4	31.6	33.4	34.6	32.8	34.6	36.9	35.1	36.9	39.2	37.4	39.2
	35.9	34.1	35.9	37.1	35.3	37.1	39.4	37.6	39.4	41.7	39.9	41.7
	38.4	36.6	38.4	39.6	37.8	39.6	41.9	40.1	41.9	44.2	42.4	44.2

EIGHT SIZE SYSTEM (SD=1.53 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE		
	REGULAR	SHORT	LONG	REGULAR	SHORT	LONG	REGULAR	SHORT	LONG	REGULAR	SHORT	LONG
	33.4	31.6	33.4	34.6	32.8	34.6	36.9	35.1	36.9	39.2	37.4	39.2
	35.9	34.1	35.9	37.1	35.3	37.1	39.4	37.6	39.4	41.7	39.9	41.7
	38.4	36.6	38.4	39.6	37.8	39.6	41.9	40.1	41.9	44.2	42.4	44.2

TWELVE SIZE SYSTEM (SD=1.51 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE		
	REGULAR	SHORT	LONG	REGULAR	SHORT	LONG	REGULAR	SHORT	LONG	REGULAR	SHORT	LONG
	33.6	31.8	33.6	34.8	33.0	34.8	37.1	35.3	37.1	39.4	37.6	39.4
	36.1	34.3	36.1	37.3	35.5	37.3	39.6	37.8	39.6	41.9	40.1	41.9
	38.6	36.8	38.6	39.8	38.0	39.8	42.1	40.3	42.1	44.4	42.6	44.4



30 WAIST CIRCUMFERENCE

SUBJECT STANDS ERECT WITH HIS ABDOMEN RELAXED. HOLDING THE TAPE IN THE HORIZONTAL PLANE AT THE LEVEL OF OMPHALION, MEASURE THE CIRCUMFERENCE OF THE WAIST.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
34.49	2.91	8.4%	28.2	29.8	30.7	32.4	34.4	36.4	38.3	39.4	41.7

FOUR SIZE SYSTEM (SD=1.76 IN.)

	SMALL	MEDIUM	LARGE	EXTRA LARGE
DESIGN MINIMUM	27.7	30.4	33.2	35.9
SIZE MEAN	30.6	33.3	36.1	38.8
DESIGN MAXIMUM	33.5	36.3	39.0	41.7

SIX SIZE SYSTEM (SD=1.83 IN.)

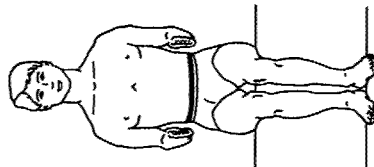
	SMALL	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
DESIGN MINIMUM	26.3	27.3	32.7	30.9	36.2	34.5	37.5	40.5
SIZE MEAN	31.1	30.3	35.7	33.9	39.3	37.5	40.5	
DESIGN MAXIMUM	33.9	33.4	38.7	36.9	42.3			

EIGHT SIZE SYSTEM (SD=1.68 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	28.3	26.7	31.2	29.6	34.1	32.5	37.0	35.4	39.8	38.2	40.9	
SIZE MEAN	31.1	29.5	34.0	32.4	36.9	35.3	39.8	38.2	42.5			
DESIGN MAXIMUM	33.9	32.3	36.8	35.2	39.6	38.1	42.5					

TWELVE SIZE SYSTEM (SD=1.64 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	28.7	27.6	31.5	30.5	34.4	32.8	37.3	35.7	40.0	38.4	41.7	40.6
SIZE MEAN	31.4	30.3	34.3	33.2	37.1	36.1	40.0	39.0	42.7	41.7		
DESIGN MAXIMUM	34.1	33.0	37.0	35.9	39.9	38.8	42.7	41.7	45.0	44.0		



31) WAIST CIRCUMFERENCE, SITTING

SUBJECT SITS ERECT ON A TABLE, HIS KNEES TOGETHER, HIS FEET UNSUPPORTED. HOLDING THE TAPE IN A HORIZONTAL PLANE AT THE LEVEL OF OMPHALION, MEASURE THE CIRCUMFERENCE OF THE WAIST.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
34.41	2.95	8.6%	28.0	29.7	30.7	32.3	34.3	36.3	38.2	39.5	41.9

FOUR SIZE SYSTEM (SD=1.91 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	27.6	30.2	32.8	35.4
DESIGN MAXIMUM	30.7	33.3	35.9	38.6
	33.9	36.5	39.1	41.7

SIX SIZE SYSTEM (SD=1.97 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SHORT	LONG	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG
SIZE MEAN	28.2	29.0	27.0	29.0	32.5	32.5	35.7	33.8	36.0	36.0	37.2	34.0
DESIGN MAXIMUM	31.2	32.2	30.3	32.5	35.7	39.0	37.0	38.2	39.2	40.5	40.5	

EIGHT SIZE SYSTEM (SD=1.82 IN.)

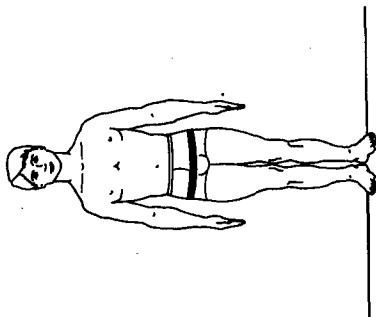
DESIGN MINIMUM	SMALL	REGULAR	SHORT	LONG	MEDIUM	REGULAR	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	28.2	28.5	26.5	29.5	31.0	31.0	29.3	33.8	32.1	36.7	36.7	34.9	34.9	34.9
DESIGN MAXIMUM	34.2	34.2	32.5	34.0	34.0	37.0	35.3	36.8	35.1	39.7	39.7	37.9	37.9	40.9

TWELVE SIZE SYSTEM (SD=1.78 IN.)

DESIGN MINIMUM	SMALL	SHORT	REGULAR	LONG	MEDIUM	REGULAR	LARGE	REGULAR	LARGE	LONG	X-LARGE	SHORT	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	28.6	28.6	27.4	29.2	31.4	31.4	30.2	34.2	33.0	34.9	34.9	32.0	37.0	35.8	35.8	34.7
DESIGN MAXIMUM	34.5	34.5	33.3	34.3	37.3	37.3	36.1	37.1	36.0	37.7	37.7	34.8	40.0	38.6	38.6	37.6

32 BUTTOCK CIRCUMFERENCE

SUBJECT STANDS ERECT, HOLDING THE TAPE IN A HORIZONTAL PLANE, MEASURE THE CIRCUM-FERENCE AROUND THE HIP REGION AT THE LEVEL OF THE BUTTOCK CIRCUMFERENCE LANDMARK.



MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
38.83	2.17	5.6%	34.0	35.3	36.1	37.3	38.8	40.2	41.6	42.5	44.3

FOUR SIZE SYSTEM (SD=1.11 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
33.8	35.6	37.4	33.8	36.0	38.3	40.5
				37.8	40.1	42.4
				39.7	41.9	44.2

SIX SIZE SYSTEM (SD=1.20 IN.)

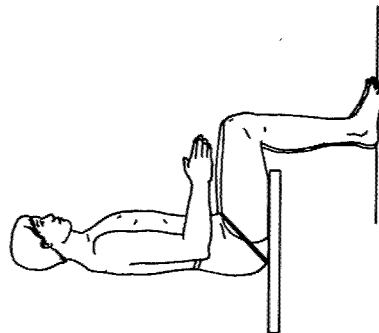
DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG
33.9	35.8	37.8	33.9	36.4	37.4	38.7	40.2	41.5	42.2	43.5
				39.4	39.4	40.6	42.2	43.5		
				41.3			44.2			

EIGHT SIZE SYSTEM (SD=1.07 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
34.0	35.7	37.5	34.0	36.3	36.3	38.6	38.0	39.8	41.0	42.1	43.9	44.5	46.0	47.3
				38.1	37.5	40.4	41.6							
				39.8	39.2	42.2								

TWELVE SIZE SYSTEM (SD=1.06 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
34.1	35.8	37.6	34.1	36.4	36.0	38.8	38.3	39.7	40.7	41.1	42.4	43.8	45.2	46.6
				38.2	37.8	40.5	41.8							
				39.9	39.5	42.3								



33 BUTTOCK CIRCUMFERENCE, SITTING

SUBJECT SITS ERECT ON A TABLE, HIS KNEES TOGETHER, HIS FEET UNSUPPORTED, WITH THE TAPE PASSING JUST UNDER THE BUTTOCKS WHERE THEY TOUCH THE SITTING SURFACE, AND BROUGHT UP AT ABOUT A 45-DEGREE ANGLE ACROSS THE LAP IN THE FURROW BETWEEN THE TORSO AND LEGS, MEASURE THE CIRCUMFERENCE OF THE BUTTOCKS.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
42.38	2.66	6.3%	36.6	38.2	39.0	40.5	42.3	44.1	45.9	47.0	49.2

FOUR SIZE SYSTEM (SD=1.49 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 36.1 38.6 41.0	MEDIUM 38.8 41.2 43.7	LARGE 41.4 43.9 46.3	EXTRA LARGE 44.1 46.5 49.0
---	-------------------------------	--------------------------------	-------------------------------	-------------------------------------

SIX SIZE SYSTEM (SD=1.58 IN.)

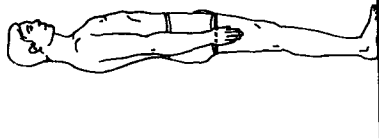
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 36.4 38.8 41.2	REGULAR 37.1 39.7 42.3	SMALL LONG 36.2 38.8 41.4	MEDIUM 38.4 40.4 43.1	REGULAR 39.1 41.5 43.9	MEDIUM LONG 39.6 42.2 44.8	LARGE 43.8 46.4 49.0	REGULAR 44.6 47.0 49.4	LARGE LONG 42.9 45.5 48.1
---	-------------------------------	---------------------------------	------------------------------------	--------------------------------	---------------------------------	-------------------------------------	-------------------------------	---------------------------------	------------------------------------

EIGHT SIZE SYSTEM (SD=1.45 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 36.4 38.8 41.2	REGULAR 37.1 39.7 42.3	SMALL LONG 36.2 38.8 41.4	MEDIUM 38.4 40.4 43.1	REGULAR 39.1 41.5 43.9	MEDIUM LONG 39.6 42.2 44.8	LARGE 43.8 46.4 49.0	REGULAR 44.6 47.0 49.4	LARGE LONG 42.9 45.5 48.1	X-LARGE 44.6 47.0 49.4	REGULAR X-LARGE 43.8 46.2 48.6	LONG 43.7 46.1 48.5
---	-------------------------------	---------------------------------	------------------------------------	--------------------------------	---------------------------------	-------------------------------------	-------------------------------	---------------------------------	------------------------------------	---------------------------------	---	------------------------------

TWELVE SIZE SYSTEM (SD=1.44 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 36.5 38.9 41.3	SHORT 36.0 38.4 40.7	SMALL LONG 35.5 37.8 40.2	MEDIUM 38.8 41.1 43.5	REGULAR 39.3 41.7 44.0	MEDIUM LONG 38.2 40.6 43.0	LARGE 41.5 43.9 46.2	REGULAR 41.0 43.3 45.7	LONG 41.0 43.3 45.7	X-LARGE 41.0 43.3 45.7	REGULAR X-LARGE 40.3 42.6 44.9	LONG 43.7 46.1 48.5
---	-------------------------------	-------------------------------	------------------------------------	--------------------------------	---------------------------------	-------------------------------------	-------------------------------	---------------------------------	------------------------------	---------------------------------	---	------------------------------



34 UPPER THIGH CIRCUMFERENCE

SUBJECT STANDS WITH HIS LEGS SLIGHTLY APART. HOLDING THE TAPE IN A PLANE AT RIGHT ANGLES TO THE LONG AXIS OF THE RIGHT LEG AT THE LEVEL OF THE LOWEST POINT ON THE GLUTEAL FURROW, MEASURE THE CIRCUMFERENCE OF THE UPPER THIGH.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
23.16	1.74	7.5%	19.0	20.2	20.9	22.0	23.1	24.3	25.4	26.1	27.5

FOUR SIZE SYSTEM (SD=1.05 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
19.9	21.7	23.5	19.1	20.7	22.4	24.0
			20.8	22.5	24.1	25.7
			22.6	24.2	25.8	27.5

SIX SIZE SYSTEM (SD=1.10 IN.)

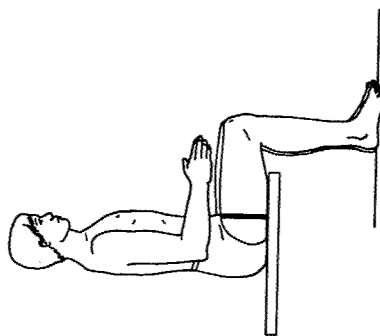
DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG
19.5	21.1	22.8	19.9	21.8	22.1	22.8	24.2	25.0
			20.2	22.9	23.9	24.6	26.0	26.8
			21.8	24.5	25.7	26.6	27.8	

EIGHT SIZE SYSTEM (SD=1.00 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG	X-LARGE REGULAR	X-LARGE LONG
19.5	21.1	22.8	19.5	21.2	21.2	22.9	23.6	25.3	26.7	27.0
			20.2	22.9	24.9	25.6	27.3	28.0	29.7	30.4
			21.8	24.5	26.2	27.0	28.7	29.4	31.1	31.8

TWELVE SIZE SYSTEM (SD=.98 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG	X-LARGE REGULAR	X-LARGE LONG
19.7	21.3	22.9	19.7	21.4	20.8	21.7	22.5	23.5	24.2	25.2
			20.6	23.0	22.4	24.8	25.7	26.5	27.5	28.5
			22.2	24.6	24.0	26.4	27.3	28.1	29.1	30.1



(35) UPPER THIGH CIRCUMFERENCE, SITTING

SUBJECT SITS ERECT ON A TABLE, HIS THIGHS LIGHTLY TOUCHING, AND HIS FEET UNSUP-
PORTED. HOLDING THE TAPE IN A PLANE PERPENDICULAR TO THE LONG AXIS OF THE UPPER
RIGHT LEG AND AS HIGH UP IN THE CROTCH AS POSSIBLE, MEASURE THE CIRCUMFERENCE OF
THE UPPER THIGH.

MEAN	SD	CV	1X	5%	TOTAL SAMPLE					90%	95%	99%
					50%	25%	10%	5%	25%			
22.79	1.68	7.4%	18.7	19.9	20.6	21.6	22.8	23.9	25.0	25.6	27.1	27.1

FOUR SIZE SYSTEM (SD= .97 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 18.9 20.5 22.1	MEDIUM 20.5 22.1 23.7	LARGE 22.1 23.7 25.3	EXTRA LARGE 23.8 25.3 26.9

SIX SIZE SYSTEM (SD=1.01 IN.)

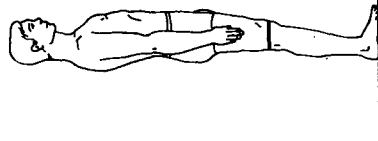
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 18.7 20.4 22.0	REGULAR 21.8 23.4 25.1	MEDIUM 20.8 22.5 24.2	LARGE 23.9 25.6 27.2	LARGE LONG 22.9 24.6 26.3

EIGHT SIZE SYSTEM (SD= .92 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 19.2 20.7 22.2	REGULAR 18.3 19.9 21.4	MEDIUM 20.9 21.1 22.4	LARGE 22.7 24.2 25.7	LARGE LONG 21.8 23.3 24.8	X-LARGE 24.4 25.9 27.4	REGULAR X-LARGE 23.5 25.0 26.5

TWELVE SIZE SYSTEM (SD= .90 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL 19.4 20.9 22.3	SHORT 18.8 20.3 21.8	MEDIUM 20.5 22.0 23.5	LARGE 22.8 24.3 25.8	LARGE LONG 22.3 23.7 25.2	X-LARGE 21.7 23.2 24.6	X-LARGE SHORT 24.5 26.0 27.5	X-LARGE REGULAR 23.4 25.0 26.5	X-LARGE LONG 23.4 25.0 26.5



36 KNEE CIRCUMFERENCE

SUBJECT STANDS ERECT, HOLDING A TAPE IN A HORIZONTAL PLANE, MEASURE THE CIRCUM-FERENCE OF THE KNEE AT THE LEVEL OF THE CENTER OF THE RELAXED PATELLA.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
15.23	.82	5.4%	13.3	13.6	14.1	14.6	15.2	15.9	16.5	16.8	17.5

FOUR SIZE SYSTEM (SD= .49 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	13.3	14.1	14.9	15.7
DESIGN MAXIMUM	14.1	14.9	15.7	16.5
	14.9	15.7	16.5	17.3

SIX SIZE SYSTEM (SD= .52 IN.)

DESIGN MINIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG
SIZE MEAN	13.5	13.4	14.4	15.3	15.4	15.4
DESIGN MAXIMUM	14.3	14.3	15.3	16.1	16.3	16.2
	15.2	15.1	16.1	17.1	17.1	17.1

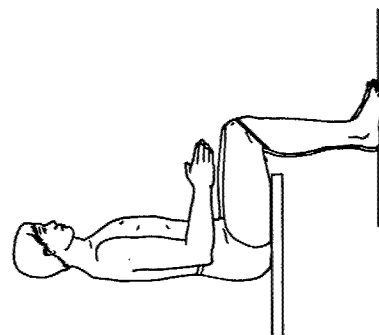
EIGHT SIZE SYSTEM (SD= .49 IN.)

DESIGN MINIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG	X-LARGE REGULAR	X-LARGE LONG
SIZE MEAN	13.3	13.2	14.1	14.0	14.9	14.8	15.7	15.6
DESIGN MAXIMUM	14.1	14.0	14.9	14.8	15.7	15.6	16.5	16.5
	14.9	14.8	15.7	15.6	16.5	16.5	17.3	17.3

TWELVE SIZE SYSTEM (SD= .49 IN.)

DESIGN MINIMUM	SMALL REGULAR	SMALL LONG	MEDIUM REGULAR	MEDIUM LONG	LARGE REGULAR	LARGE LONG	X-LARGE REGULAR	X-LARGE LONG
SIZE MEAN	13.3	13.2	14.1	14.0	14.9	14.8	15.7	15.6
DESIGN MAXIMUM	14.1	14.0	14.9	14.8	15.7	15.6	16.5	16.4
	14.9	14.8	15.7	15.6	16.5	16.4	17.3	17.3

(37) KNEE CIRCUMFERENCE, SITTING



SUBJECT SITS ERECT, HIS FEET RESTING ON A SURFACE SO THAT THE KNEES ARE BENT AT ABOUT RIGHT ANGLES. WITH THE TAPE PASSING UNDER THE POPLITEAL AREA OF THE RIGHT LEG AND BROUGHT UP AT ABOUT A 45-DEGREE ANGLE OVER THE KNEE, MEASURE THE MAXIMUM CIRCUMFERENCE OF THE RIGHT KNEE.

	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
MEAN	15.47	.84	5.4%	13.5	14.0	14.3	14.8	15.5	16.1	16.7	17.0
											17.7

FOUR SIZE SYSTEM (SD= .50 IN.)

	SMALL	MEDIUM	LARGE	EXTRA LARGE
DESIGN MINIMUM	13.5	14.3	15.1	16.0
SIZE MEAN	14.3	15.1	15.9	16.8
DESIGN MAXIMUM	15.1	15.9	16.8	17.6

SIX SIZE SYSTEM (SD= .52 IN.)

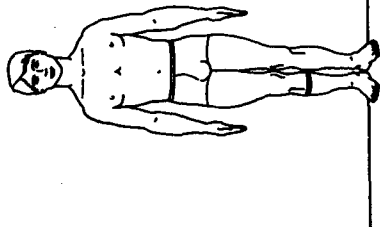
	SMALL	REGULAR	MEDIUM	LARGE	REGULAR	LARGE	LONG
DESIGN MINIMUM	13.7	14.5	15.3	16.1	16.9	17.7	18.5
SIZE MEAN	14.5	15.3	16.1	16.9	17.7	18.5	19.3
DESIGN MAXIMUM	15.4	16.2	17.0	17.8	18.6	19.4	20.2

EIGHT SIZE SYSTEM (SD= .49 IN.)

	SMALL	REGULAR	MEDIUM	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
DESIGN MINIMUM	13.4	14.3	15.1	15.9	16.7	17.5	18.3	19.1	19.9	20.7	21.5
SIZE MEAN	14.3	15.1	15.9	16.7	17.5	18.3	19.1	19.9	20.7	21.5	22.3
DESIGN MAXIMUM	15.1	16.0	16.8	17.6	18.4	19.2	20.0	20.8	21.6	22.4	23.2

TWELVE SIZE SYSTEM (SD= .49 IN.)

	SMALL	REGULAR	MEDIUM	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
DESIGN MINIMUM	13.4	14.3	15.1	15.9	16.7	17.5	18.3	19.1	19.9	20.7	21.5
SIZE MEAN	14.3	15.1	15.9	16.7	17.5	18.3	19.1	19.9	20.7	21.5	22.3
DESIGN MAXIMUM	15.1	16.0	16.8	17.6	18.4	19.2	20.0	20.8	21.6	22.4	23.2



38 CALF CIRCUMFERENCE

SUBJECT STANDS WITH LEGS SLIGHTLY APART. HOLDING A TAPE IN A PLANE PERPENDICULAR TO THE LONG AXIS OF THE LEG, MEASURE THE MAXIMUM CIRCUMFERENCE OF THE RIGHT CALF.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
14.64	.89	6.1%	12.5	13.0	13.4	14.0	14.6	15.3	15.9	16.2	17.0

FOUR SIZE SYSTEM (SD= .62 IN.)

	SMALL	MEDIUM	LARGE	EXTRA LARGE
DESIGN MINIMUM	12.5	13.3	14.1	14.8
SIZE MEAN	13.5	14.3	15.1	15.9
DESIGN MAXIMUM	14.6	15.3	16.1	16.9

SIX SIZE SYSTEM (SD= .63 IN.)

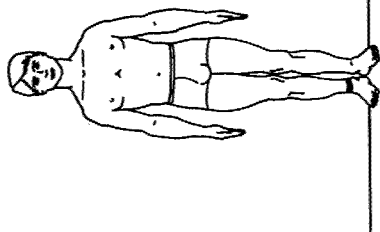
	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
DESIGN MINIMUM	12.7	13.6	14.6	13.5	14.5	15.5	14.9	15.9	16.6
SIZE MEAN	13.7	14.6	15.5	14.9	15.8	16.7	15.9	16.8	17.5
DESIGN MAXIMUM	14.7	15.6	16.5	15.9	16.8	17.7	16.9	17.8	18.5

EIGHT SIZE SYSTEM (SD= .60 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	12.7	13.6	14.6	13.5	14.5	15.5	14.9	15.9	16.6	17.1	17.8	18.5
SIZE MEAN	13.7	14.6	15.5	14.9	15.8	16.7	15.9	16.8	17.5	18.2	18.9	19.6
DESIGN MAXIMUM	14.7	15.6	16.5	15.9	16.8	17.7	16.9	17.8	18.5	19.2	19.9	20.6

TWELVE SIZE SYSTEM (SD= .60 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	12.7	13.6	14.6	13.5	14.5	15.5	14.9	15.9	16.6	17.1	17.8	18.5
SIZE MEAN	13.7	14.6	15.5	14.9	15.8	16.7	15.9	16.8	17.5	18.2	18.9	19.6
DESIGN MAXIMUM	14.7	15.6	16.5	15.9	16.8	17.7	16.9	17.8	18.5	19.2	19.9	20.6



39 ANKLE CIRCUMFERENCE

SUBJECT STANDS WITH LEGS SLIGHTLY APART. HOLDING A TAPE IN A PLANE PERPENDICULAR TO THE LONG AXIS OF THE LEG, MEASURE THE MINIMUM CIRCUMFERENCE OF THE RIGHT ANKLE.

MEAN	SD	CV	TOTAL SAMPLE									
			1%	5%	10%	25%	50%	75%	90%	95%	99%	
8.82	.50	5.6%	7.5	7.7	7.9	8.5	8.9	9.3	9.5	9.9	10.4	

FOUR SIZE SYSTEM (SD= .38 IN.)

DESIGN MINIMUM	SIZE MEAN	DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			EXTRA LARGE		
			MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
			7.6	8.0	8.4	8.0	8.4	8.8	8.4	8.8	9.2	8.8	9.2	9.6
			8.3	8.6	9.0	8.6	8.9	9.3	9.0	9.4	9.8	9.4	9.8	10.2
			8.9	9.3	9.7	9.3	9.7	10.1	9.7	10.1	10.5	10.1	10.5	10.9

SIX SIZE SYSTEM (SD= .39 IN.)

DESIGN MINIMUM	SIZE MEAN	DESIGN MAXIMUM	SMALL		REGULAR		MEDIUM		LARGE		LONG	
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
			7.6	8.0	7.6	8.0	8.2	8.6	8.2	8.6	8.7	9.1
			8.3	8.7	8.3	8.7	8.9	9.3	8.9	9.3	9.4	9.8
			9.0	9.4	9.0	9.4	9.5	9.9	10.0	10.4	10.5	10.9

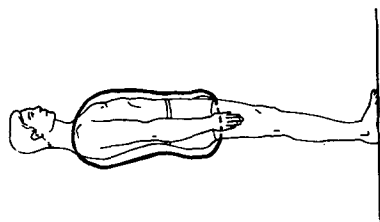
EIGHT SIZE SYSTEM (SD= .38 IN.)

DESIGN MINIMUM	SIZE MEAN	DESIGN MAXIMUM	SMALL		REGULAR		MEDIUM		LARGE		LONG		X-LARGE		X-LARGE LONG	
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
			7.6	8.0	7.6	8.0	8.0	8.4	8.4	8.8	8.8	9.2	9.6	10.0	10.4	10.8
			8.3	8.7	8.3	8.7	8.6	9.0	9.0	9.4	9.4	9.8	10.2	10.6	11.0	11.4
			8.9	9.3	8.9	9.3	9.2	9.6	9.6	10.0	10.0	10.4	10.8	11.2	11.6	12.0

TWELVE SIZE SYSTEM (SD= .38 IN.)

DESIGN MINIMUM	SIZE MEAN	DESIGN MAXIMUM	SMALL		REGULAR		MEDIUM		LARGE		LONG		X-LARGE		X-LARGE LONG	
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
			7.6	8.0	7.6	8.0	8.0	8.4	8.4	8.8	8.8	9.2	9.6	10.0	10.4	10.8
			8.3	8.7	8.3	8.7	8.6	9.0	9.0	9.4	9.4	9.8	10.2	10.6	11.0	11.4
			8.9	9.3	8.9	9.3	9.2	9.6	9.6	10.0	10.0	10.4	10.8	11.2	11.6	12.0

40 VERTICAL TRUNK CIRCUMFERENCE



SUBJECT STANDS WITH HIS LEGS SLIGHTLY APART. WITH THE TAPE PASSING THROUGH THE CROTCH AND HELD AT THE MIDPOINTS OF THE RIGHT BUTTOCK AND THE RELAXED RIGHT SHOULDER BY THE ANTHROPMETRIST'S LEFT HAND, MEASURE THE VERTICAL CIRCUMFERENCE OF THE TORSO. THE SUBJECT HOLDS THE TAPE IN PLACE ON HIS CHEST WITH HIS LEFT HAND. THE TAPE SHOULD BE PRESSED INTO THE CONCAVITY OF THE SMALL OF THE BACK SO THAT IT FOLLOWS THE BODY SURFACE AT ALL POINTS.

MEAN	SD	CV	TOTAL SAMPLE					90%	95%	99%
			1%	5%	10%	25%	50%			
66.17	2.82	4.3%	59.7	61.7	62.6	64.2	66.1	69.8	71.0	73.3

FOUR SIZE SYSTEM (SD=1.70 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			EXTRA LARGE		
	REGULAR	SMALL	LONG	REGULAR	SMALL	LONG	REGULAR	SMALL	LONG	REGULAR	SMALL	LONG
	59.4	59.1	61.0	62.6	62.0	64.9	67.8	67.8	67.8	70.6	70.6	73.4
	62.2	61.9	63.8	65.4	64.8	67.7	70.6	70.6	70.6	73.4	73.4	73.4
	65.0	64.8	66.7	68.2	67.6	70.5	73.4	73.4	73.4	73.4	73.4	73.4

SIX SIZE SYSTEM (SD=1.71 IN.)

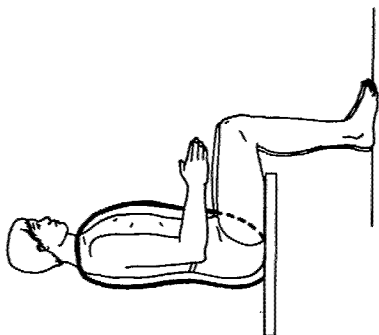
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		REGULAR		MEDIUM		LONG		LARGE		REGULAR		LARGE		LONG	
	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL
	58.7	59.4	60.2	61.0	62.6	63.8	64.2	65.7	67.0	68.5	69.8	71.4	73.0	74.5	76.0	77.3
	61.4	62.2	63.0	63.8	65.4	66.7	67.0	68.5	69.8	71.4	73.0	74.5	76.0	77.3	78.8	80.0
	64.1	64.8	65.6	66.7	68.2	69.8	71.4	73.0	74.5	76.0	77.3	78.8	80.0	81.5	83.0	84.3

EIGHT SIZE SYSTEM (SD=1.63 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		REGULAR		MEDIUM		LONG		LARGE		REGULAR		LARGE		REGULAR		X-LARGE		LONG	
	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL
	58.7	59.4	60.2	61.0	62.9	64.1	64.2	65.6	66.9	68.3	69.5	71.0	72.3	73.7	75.0	76.3	77.7	79.0	80.3	81.6
	61.4	62.2	63.0	63.8	65.6	66.9	67.0	68.5	69.8	71.4	73.0	74.5	76.0	77.3	78.8	80.0	81.5	83.0	84.3	85.7
	64.1	64.8	65.6	66.7	68.2	69.8	71.4	73.0	74.5	76.0	77.3	78.8	80.0	81.5	83.0	84.3	85.7	87.0	88.3	89.6

TWELVE SIZE SYSTEM (SD=1.60 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		REGULAR		MEDIUM		LONG		LARGE		REGULAR		LARGE		REGULAR		X-LARGE		LONG	
	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL
	58.5	59.5	60.5	61.3	62.2	63.2	64.0	64.9	65.8	66.6	67.5	68.5	69.3	70.2	71.2	72.0	72.9	73.9	74.8	75.7
	61.2	62.1	63.1	63.9	64.9	65.8	66.6	67.5	68.5	69.3	70.2	71.2	72.0	72.9	73.9	74.8	75.7	76.6	77.5	78.4
	63.8	64.8	65.8	66.5	67.5	68.5	69.3	70.2	71.2	72.0	72.9	73.9	74.8	75.7	76.6	77.5	78.4	79.3	80.2	81.1



④ VERTICAL TRUNK CIRCUMFERENCE, SITTING

WHILE THE SUBJECT STANDS, HIS LEGS SLIGHTLY APART, THE TAPE IS PASSED THROUGH THE CROTCH AND IS HELD BY THE ANTHROPOMETRIST'S LEFT HAND AT THE MIDPOINT OF THE RIGHT BUTTOCK, AND BY GRAVITY AT THE MIDPOINT OF THE RIGHT SHOULDER. HOLDING THE TAPE IN PLACE ON HIS ABDOMEN WITH HIS LEFT HAND, THE SUBJECT SITS DOWN IN AN ERECT POSITION BUT WITH SHOULDERS RELAXED. MEASURE THE VERTICAL CIRCUMFERENCE OF THE TORSO, PRESSING THE TAPE INTO THE CONCAVITY OF THE BACK TO ENSURE THAT IT FOLLOWS THE BODY SURFACE AT ALL POINTS.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
63.51	2.74	4.3%	57.5	59.2	60.1	61.6	63.4	65.3	67.1	68.2	70.3

FOUR SIZE SYSTEM (SD=1.82 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LARGE	EXTRA LARGE
56.8	59.7	62.7	56.6	59.3	61.9	64.5	67.5
			59.6	62.3	64.9	67.5	70.5

SIX SIZE SYSTEM (SD=1.80 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG
56.2	59.0	61.9	56.6	59.6	61.5	62.4	64.3	67.3	70.2	
			58.8	60.7	62.5	64.4	66.3	68.3		

EIGHT SIZE SYSTEM (SD=1.74 IN.)

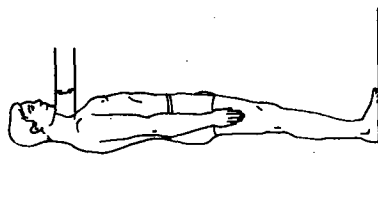
DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
56.2	59.0	61.9	56.6	59.6	61.5	62.4	64.3	67.3	70.2					
			58.8	60.7	62.5	64.4	66.3	68.3						

TWELVE SIZE SYSTEM (SD=1.70 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
56.2	59.0	61.9	56.6	59.6	61.5	62.4	64.3	67.3	70.2					
			58.8	60.7	62.5	64.4	66.3	68.3						

42 ANTERIOR NECK LENGTH

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFORT PLANE. USING THE TAPE, MEASURE THE SURFACE DISTANCE FROM THE ANTERIOR NECK LANDMARK TO THE SUPRASTERNAL LANDMARK.



MEAN	SD	CV	TOTAL SAMPLE					
			1%	5%	10%	25%	50%	95%
3.32	.66	20.0%	1.5	2.0	2.3	2.8	3.4	4.5
							3.9	5.1

FOUR SIZE SYSTEM (SD= .65 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		EXTRA LARGE	
	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG
	2.1	2.8	2.3	3.0	2.2	2.9	2.1	2.8
	3.1	3.8	3.3	4.0	3.3	4.0	3.2	3.9
	4.1	4.9	4.4	5.1	4.3	5.0	4.3	5.0

SIX SIZE SYSTEM (SD= .63 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		X-LARGE	
	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG
	2.1	2.8	1.9	2.6	1.6	2.3	1.7	2.4
	3.1	3.8	2.9	3.6	2.7	3.4	2.8	3.5
	4.1	4.9	3.9	4.6	3.7	4.4	3.8	4.5

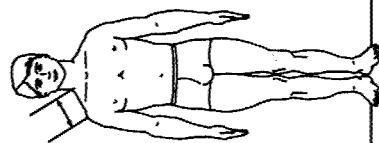
EIGHT SIZE SYSTEM (SD= .62 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		X-LARGE		X-X-LARGE	
	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG
	2.2	2.8	2.0	2.7	2.5	3.2	2.5	3.2	2.1	2.8
	3.2	3.8	3.0	3.7	3.5	4.2	3.5	4.2	3.1	3.8
	4.2	4.8	4.1	4.7	4.6	5.3	4.6	5.3	4.1	4.8

TWELVE SIZE SYSTEM (SD= .60 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		X-LARGE		X-X-LARGE	
	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG
	2.1	2.9	1.9	2.7	2.7	3.5	2.2	3.0	2.1	2.9
	3.1	3.9	2.9	3.7	3.7	4.5	3.2	4.0	3.1	3.9
	4.1	4.9	3.9	4.7	4.6	5.4	4.2	5.0	4.1	4.9

43 SHOULDER LENGTH



SUBJECT STANDS ERECT, HIS ARMS HANGING NATURALLY AT HIS SIDES. USING THE TAPE, MEASURE THE SURFACE DISTANCE ALONG THE TOP OF THE SHOULDER FROM THE RIGHT NECK LANDMARK TO THE RIGHT ACROMIAL LANDMARK.

MEAN	SD	CV	TOTAL SAMPLE								
			1%	5%	10%	25%	50%	75%	90%	95%	99%
6.54	.50	7.6%	5.4	5.6	5.7	6.0	6.5	7.0	7.4	7.5	8.2

FOUR SIZE SYSTEM (SD= .47 IN.)

		SMALL		MEDIUM		LARGE		EXTRA LARGE	
DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM
5.4	7.0	5.5	7.0	5.7	7.2	5.8	7.4	6.0	7.6

SIX SIZE SYSTEM (SD= .47 IN.)

		SMALL		REGULAR		MEDIUM		LARGE		LARGE LONG	
DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM
5.4	7.0	5.4	7.0	5.6	7.2	5.8	7.4	6.0	7.6	6.1	7.6

EIGHT SIZE SYSTEM (SD= .47 IN.)

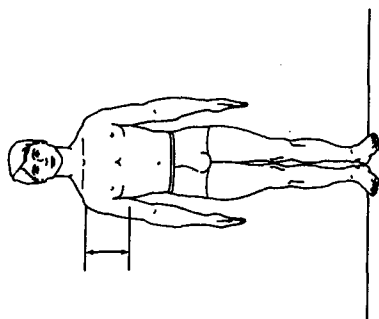
		SMALL		REGULAR		MEDIUM		LARGE		LARGE LONG		X-LARGE		X-LARGE LONG	
DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM
5.4	7.0	5.4	7.0	5.6	7.2	5.8	7.4	6.0	7.6	6.1	7.6	6.2	7.7	6.3	7.8

TWELVE SIZE SYSTEM (SD= .47 IN.)

		SMALL		REGULAR		MEDIUM		LARGE		LARGE LONG		X-LARGE		X-LARGE LONG	
DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM
5.4	7.0	5.4	7.0	5.6	7.2	5.8	7.4	6.0	7.6	6.1	7.6	6.2	7.7	6.3	7.8

④ ACROMION-BICEPS CIRCUMFERENCE LEVEL LENGTH

SUBJECT STANDS ERECT WITH HIS ARMS HANGING AT HIS SIDES. USING THE BEAM CALIPER, MEASURE THE STRAIGHT-LINE DISTANCE BETWEEN THE RIGHT ACROMION LANDMARK AND THE BICEPS LANDMARK ON THE RIGHT ARM.



MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
7.48	.59	7.9%	5.7	6.3	6.5	7.0	7.5	8.0	8.4	8.7	9.3

FOUR SIZE SYSTEM (SD= .56 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
	6.2 7.1 8.0	6.4 7.3 8.3	6.7 7.6 8.5	6.9 7.9 8.8

SIX SIZE SYSTEM (SD= .54 IN.)

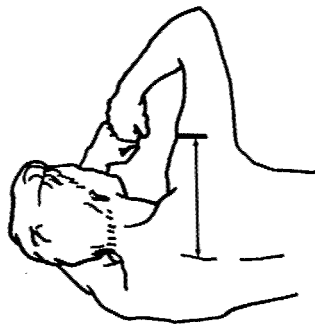
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
	6.0 6.9 7.8	6.1 7.0 7.9	6.6 7.5 8.4	6.3 7.2 8.1	6.8 7.7 8.6	6.5 7.4 8.3	6.9 7.8 8.7	6.6 7.5 8.4	7.0 7.9 8.8

EIGHT SIZE SYSTEM (SD= .54 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
	6.0 6.9 7.8	6.1 7.0 7.9	6.5 7.4 8.3	6.2 7.1 8.0	6.7 7.6 8.5	6.4 7.3 8.2	6.9 7.8 8.7	6.6 7.5 8.4	7.1 8.0 8.9	6.6 7.5 8.4	6.9 7.8 8.6	7.2 8.1 9.0

TWELVE SIZE SYSTEM (SD= .53 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
	6.0 6.8 7.7	6.3 7.2 8.0	6.6 7.5 8.4	6.2 7.0 7.9	6.5 7.4 8.2	6.8 7.7 8.6	6.4 7.2 8.1	6.7 7.6 8.4	7.0 7.9 8.8	6.6 7.4 8.3	6.9 7.8 8.6	7.2 8.1 9.0



(45) SLEEVE LENGTH, SPINE-SCYE

SUBJECT STANDS, HIS ARMS HELD HORIZONTALLY, HIS ELBOWS BENT AT RIGHT ANGLES, HIS FISTS TOUCHING, AND HIS SHOULDERS RELAXED. WITH THE TAPE HELD IN A HORIZONTAL PLANE AND PASSING OVER THE TIP OF THE RIGHT ELBOW, MEASURE THE DISTANCE FROM THE MIDLINE OF THE SPINE TO THE RIGHT SCYE LANDMARK.

MEAN	SD	CV	1%	5%	TOTAL SAMPLE					90%	95%	99%
					10%	25%	50%	75%	11.7			
11.20	.71	6.4%	9.5	9.8	10.1	10.6	11.2	11.7	12.2	12.5	12.9	13.2

FOUR SIZE SYSTEM (SD= .62 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	9.5	10.0	10.4	10.9
DESIGN MAXIMUM	10.6	11.0	11.4	11.9
	11.6	12.0	12.5	12.9

SIX SIZE SYSTEM (SD= .62 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
SIZE MEAN	9.5	9.7	10.7	10.2	11.2	12.2	10.2	10.7	10.7
DESIGN MAXIMUM	10.5	10.7	11.7	11.2	12.2	12.3	11.2	11.7	11.8
	11.6	11.7		12.2			12.3	12.8	12.8

EIGHT SIZE SYSTEM (SD= .62 IN.)

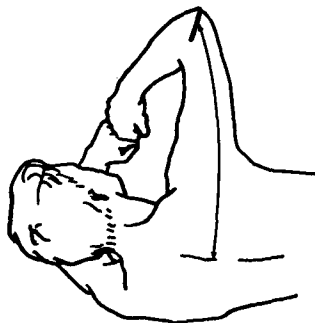
DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	9.5	9.6	10.6	10.0	10.8	11.4	10.4	10.4	10.8	10.8	10.9	10.9
DESIGN MAXIMUM	10.5	10.6	11.6	11.0	11.0	12.0	11.4	11.4	11.9	11.9	11.9	11.9
	11.6			12.0	12.0	12.4	12.5	12.5	12.9	12.9		12.9

TWELVE SIZE SYSTEM (SD= .62 IN.)

DESIGN MINIMUM	SMALL	SHORT	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	SHORT	REGULAR	LARGE LONG	X-LARGE	SHORT	REGULAR	X-LARGE LONG
SIZE MEAN	9.5	9.5	9.6	10.0	10.0	10.0	10.0	10.4	10.4	10.4	10.4	10.4	10.8	10.9	10.9
DESIGN MAXIMUM	10.5	10.6	10.6	11.0	11.0	11.0	11.0	11.4	11.4	11.4	11.5	11.5	11.9	11.9	11.9
	11.6	11.6	11.6	12.0	12.0	12.0	12.0	12.4	12.4	12.5	12.5	12.9	12.9	12.9	12.9

46 SLEEVE LENGTH, SPINE-ELBOW

SUBJECT STANDS, HIS ARMS HELD HORIZONTALLY, HIS ELBOWS BENT AT RIGHT ANGLES, HIS FISTS TOUCHING, AND HIS SHOULDERS RELAXED. WITH THE TAPE HELD IN A HORIZONTAL PLANE AND PASSING OVER THE TIP OF THE RIGHT ELBOW, MEASURE THE DISTANCE FROM THE MIDLINE OF THE SPINE TO THE TIP OF THE RIGHT ELBOW.



MEAN	SD	CV	1%	5%	10%	TOTAL SAMPLE			90%	95%	99%
						50%	75%	90%			
23.85	1.03	4.3%	21.4	22.1	22.4	23.1	24.6	25.3	25.7	26.5	26.5

FOUR SIZE SYSTEM (SD= .84 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	21.3	22.1	22.9	23.7
DESIGN MAXIMUM	22.7	23.5	24.2	25.0
	24.1	24.8	25.6	26.4

SIX SIZE SYSTEM (SD= .80 IN.)

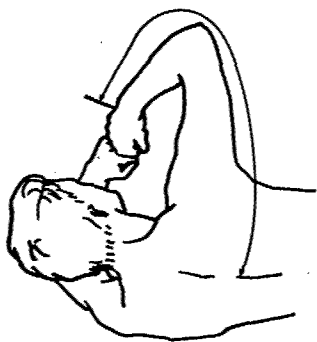
DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
SIZE MEAN	21.1	21.2	22.2	22.0	23.0	24.3	22.7	23.7	25.1
DESIGN MAXIMUM	22.4	22.5	23.6	23.3	24.6	25.6	24.0	25.4	26.4
	23.7	23.9	24.9	24.6			25.4		

EIGHT SIZE SYSTEM (SD= .79 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	21.1	21.2	22.0	21.7	22.7	22.4	23.3	23.7	24.4	25.7	26.6	28.0
DESIGN MAXIMUM	22.4	22.5	23.3	23.0	24.0	23.7	24.7	25.0	26.0	26.7		
	23.7	23.9	24.6	24.3	25.3							

TWELVE SIZE SYSTEM (SD= .76 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	20.9	21.6	22.2	21.6	22.2	22.9	23.3	23.9	24.8	25.5	26.1	26.7
DESIGN MAXIMUM	22.2	22.8	23.4	22.9	23.5	24.1	24.5	25.4	26.1	26.7		
	23.5	24.1	24.7	24.1	24.8	25.4	25.4	25.4	26.1	26.7		



⑦ SLEEVE LENGTH, SPINE-WRIST

SUBJECT STANDS, HIS ARMS HELD HORIZONTALLY, HIS ELBOWS BENT AT RIGHT ANGLES, HIS FISTS TOUCHING, AND HIS SHOULDERS RELAXED, WITH THE TAPE HELD IN A HORIZONTAL PLANE AND PASSING OVER THE TIP OF THE RIGHT ELBOW, MEASURE THE DISTANCE FROM THE MIDLINE OF THE SPINE TO THE END OF THE ULNAR STYLOID PROCESS OF THE RIGHT WRIST.

MEAN	SD	CV	1%	5%	TOTAL SAMPLE				75%	90%	95%	99%
					5%	10%	25%	50%				
35.75	1.39	3.9%	32.6	33.4	33.9	34.6	35.7	36.7	37.6	38.2	38.9	39.3

FOUR SIZE SYSTEM (SD=1.09 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			EXTRA LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	32.3	33.4	34.5	33.4	34.5	35.6	34.5	35.6	36.7	35.6	36.7	37.8
	34.1	35.2	36.3	35.2	36.3	37.4	36.3	37.4	38.5	37.4	38.5	39.6
	35.9	37.0	38.1	37.0	38.1	39.2	38.1	39.2	40.3	39.2	40.3	41.4

SIX SIZE SYSTEM (SD=1.00 IN.)

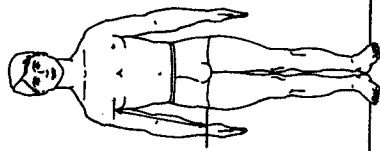
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE			XX-LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	31.9	32.9	33.9	32.9	33.9	34.9	33.9	34.9	35.9	34.9	35.9	36.9	35.9	36.9	37.9
	33.5	34.5	35.5	34.5	35.5	36.5	35.5	36.5	37.5	36.5	37.5	38.5	37.5	38.5	39.5
	35.1	36.1	37.1	36.1	37.1	38.1	37.1	38.1	39.1	38.1	39.1	40.1	39.1	40.1	41.1

EIGHT SIZE SYSTEM (SD= .98 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE			XX-LARGE			XXX-LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	31.9	32.9	33.9	32.9	33.9	34.9	33.9	34.9	35.9	34.9	35.9	36.9	35.9	36.9	37.9	36.9	37.9	38.9
	33.5	34.5	35.5	34.5	35.5	36.5	35.5	36.5	37.5	36.5	37.5	38.5	37.5	38.5	39.5	38.5	39.5	40.5
	35.1	36.1	37.1	36.1	37.1	38.1	37.1	38.1	39.1	38.1	39.1	40.1	39.1	40.1	41.1	40.1	41.1	42.1

TWELVE SIZE SYSTEM (SD= .91 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE			XX-LARGE			XXX-LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	31.9	32.9	33.9	32.9	33.9	34.9	33.9	34.9	35.9	34.9	35.9	36.9	35.9	36.9	37.9	36.9	37.9	38.9
	33.5	34.5	35.5	34.5	35.5	36.5	35.5	36.5	37.5	36.5	37.5	38.5	37.5	38.5	39.5	38.5	39.5	40.5
	35.1	36.1	37.1	36.1	37.1	38.1	37.1	38.1	39.1	38.1	39.1	40.1	39.1	40.1	41.1	40.1	41.1	42.1



④ SLEEVE INSEAM LENGTH

SUBJECT STANDS, HIS RIGHT ELBOW EXTENDED WITH THE HAND ABOUT 15 CM FROM THE SIDE OF THE BODY. USING THE TAPE, MEASURE THE STRAIGHT LINE DISTANCE FROM THE ANTERIOR CREASE OF THE UPPER ARM WITH THE TORSO TO THE WRIST CIRCUMFERENCE LANDMARK.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
19.11	1.01	5.3%	16.6	17.3	17.7	18.4	19.1	19.9	20.5	21.0	21.6

FOUR SIZE SYSTEM (SD= .92 IN.)

	SMALL	MEDIUM	LARGE	EXTRA LARGE
DESIGN MINIMUM	16.8	17.3	17.8	18.3
SIZE MEAN	18.3	18.8	19.3	19.8
DESIGN MAXIMUM	19.9	20.4	20.9	21.3

SIX SIZE SYSTEM (SD= .84 IN.)

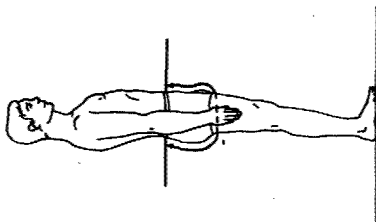
	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
DESIGN MINIMUM	16.5	17.9	18.1	16.8	18.2	18.4	17.1	18.5	18.7
SIZE MEAN	17.8	19.3	19.5	18.2	19.6	19.8	18.5	19.9	20.1
DESIGN MAXIMUM	19.2	20.6	20.9	19.6	21.0	21.2	19.9	21.5	21.5

EIGHT SIZE SYSTEM (SD= .82 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	16.5	17.9	18.0	16.8	18.2	18.3	17.2	18.6	17.5	19.0	18.3	19.3
SIZE MEAN	17.8	19.3	19.3	18.2	19.6	19.6	18.5	20.0	18.9	20.3	19.6	20.6
DESIGN MAXIMUM	19.2	20.6	20.6	19.5	21.0	21.0	19.9	21.3	20.2	21.7	20.8	21.8

TWELVE SIZE SYSTEM (SD= .75 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	16.4	17.3	18.3	16.7	17.7	18.6	17.0	18.0	19.0	18.3	19.3	19.3
SIZE MEAN	17.6	18.6	19.5	17.9	18.9	19.9	18.3	19.2	20.2	19.6	20.6	20.6
DESIGN MAXIMUM	18.9	19.8	20.8	19.2	20.2	21.1	19.5	20.5	21.5	20.8	21.8	21.8



④ CROTCH LENGTH

SUBJECT STANDS WITH HIS LEGS SLIGHTLY APART. USING THE TAPE, MEASURE THE SURFACE DISTANCE THROUGH THE CROTCH AND OVER THE MIDDLE OF THE RIGHT BUTTOCK FROM THE CENTER OF THE UMBILICUS TO THE WAIST LEVEL ON THE RIGHT SIDE OF THE BACK.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
27.60	1.74	6.3%	23.9	25.0	25.5	26.5	27.7	28.9	30.1	30.9	32.2

FOUR SIZE SYSTEM (SD=1.27 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	23.5	25.0	26.5	28.0
DESIGN MAXIMUM	25.6	27.1	28.6	30.1
	27.7	29.2	30.7	32.2

SIX SIZE SYSTEM (SD=1.30 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
SIZE MEAN	23.5	23.9	24.0	25.7	26.0	26.8	27.4	27.5	27.5
DESIGN MAXIMUM	25.6	26.0	26.2	27.6	27.9	29.6	29.6	29.7	29.7
	27.7	28.2	28.3	29.9	30.1	31.7	31.7	31.8	31.8

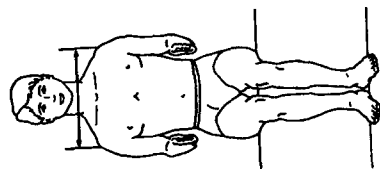
EIGHT SIZE SYSTEM (SD=1.27 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	23.5	23.6	23.6	25.0	25.1	25.4	26.4	26.6	26.6	27.9	27.9	28.0
DESIGN MAXIMUM	25.6	25.7	25.7	27.1	27.2	28.5	28.5	28.6	28.6	30.0	30.0	30.1
	27.7	27.8	27.8	29.1	29.3	30.6	30.7	30.7	30.7	32.1	32.1	32.2

TWELVE SIZE SYSTEM (SD=1.27 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	23.5	23.5	23.6	25.0	25.1	25.4	26.4	26.5	26.6	27.9	28.0	28.0
DESIGN MAXIMUM	25.6	25.6	25.7	27.1	27.2	28.5	28.5	28.6	28.7	30.0	30.1	30.1
	27.7	27.7	27.8	29.1	29.3	30.6	30.7	30.7	30.8	32.1	32.1	32.2

50 BIACROMIAL BREADTH



SUBJECT SITS ERECT, HIS HEAD IN THE FRANKFURT PLANE, HIS ARMS HANGING RELAXED, AND HIS FOREARMS AND HANDS EXTENDED FORWARD HORIZONTALLY. USING A BEAM CALIPER, MEASURE THE HORIZONTAL DISTANCE BETWEEN THE RIGHT AND LEFT ACROMIAL LANDMARKS.

MEAN	SD	CV	TOTAL SAMPLE					90%	95%	99%
			5%	10%	25%	50%	75%			
16.04	.76	4.8%	14.0	14.6	15.0	15.5	16.1	16.6	17.1	17.4
										18.0

FOUR SIZE SYSTEM (SD= .69 IN.)

		SMALL		MEDIUM		LARGE		EXTRA LARGE	
DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM
14.3	15.4	14.3	15.4	14.7	15.8	15.1	16.3	15.6	16.7
15.4	16.5	15.4	16.5	15.8	17.0	16.3	17.4	16.7	17.8

SIX SIZE SYSTEM (SD= .68 IN.)

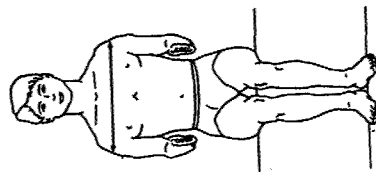
		SMALL		MEDIUM		LARGE		LARGE LONG	
DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM
14.2	15.3	14.2	15.3	14.8	15.9	15.1	16.2	15.2	16.3
15.3	16.4	15.3	16.4	15.9	17.0	16.2	17.3	16.3	17.5
16.4		16.4		17.0		17.3		17.5	17.8

EIGHT SIZE SYSTEM (SD= .68 IN.)

		SMALL		MEDIUM		LARGE		LARGE LONG		X-LARGE		X-LARGE LONG	
DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM
14.2	15.3	14.2	15.3	14.9	16.0	15.0	16.1	15.3	16.4	15.4	16.5	15.7	16.8
15.3	16.4	15.3	16.4	16.0	17.1	16.1	17.2	16.4	17.5	16.5	17.6	16.8	17.9
16.4		16.4		17.1		17.2		17.5		17.6		17.9	

TWELVE SIZE SYSTEM (SD= .68 IN.)

		SMALL		MEDIUM		LARGE		LARGE LONG		X-LARGE		X-LARGE LONG	
DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM	DESIGN MINIMUM	DESIGN MAXIMUM
14.1	15.3	14.1	15.3	14.9	16.0	15.0	16.1	15.3	16.4	15.4	16.5	15.7	16.8
15.3	16.4	15.3	16.4	16.0	17.1	16.1	17.2	16.4	17.5	16.5	17.6	16.8	17.9
16.4		16.4		17.1		17.2		17.5		17.6		17.9	



51 SHOULDER (BIDELTOID) BREADTH

SUBJECT SITS ERECT, HIS HEAD IN THE FRANKFURT PLANE, HIS UPPER ARMS HANGING RELAXED, AND HIS FOREARMS AND HANDS EXTENDED FORWARD HORIZONTALLY, USING A BEAM CALIPER, MEASURE THE HORIZONTAL DISTANCE BETWEEN THE MAXIMUM LATERAL PROTRUSIONS OF THE RIGHT AND LEFT DELTOID MUSCLES.

MEAN	SD	CV	TOTAL SAMPLE								
			1%	5%	10%	25%	50%	75%	90%	95%	99%
18.99	1.01	5.3%	16.5	17.2	17.6	18.2	19.0	19.7	20.4	20.9	21.5

FOUR SIZE SYSTEM (SD= .68 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			EXTRA LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	16.9	17.7	18.8	17.5	18.6	19.7	18.4	19.5	20.6	19.3	20.4	21.5

SIX SIZE SYSTEM (SD= .70 IN.)

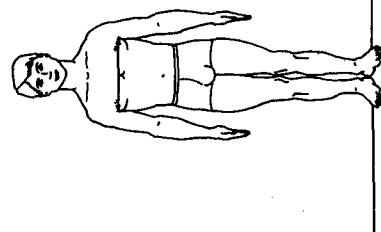
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	16.7	17.8	18.9	18.1	19.2	20.1	17.8	18.9	20.1	19.2	20.4	21.5

EIGHT SIZE SYSTEM (SD= .67 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	16.7	17.8	18.9	17.3	18.4	19.5	18.5	19.6	20.7	18.3	19.4	20.5

TWELVE SIZE SYSTEM (SD= .66 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	16.7	17.8	18.9	17.3	18.4	19.5	18.6	19.7	20.8	18.2	19.3	20.4



52 CHEST BREADTH

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFORD PLANE, AND HIS ARMS SLIGHTLY ABDUCTED. USING A BEAM CALIPER, MEASURE THE HORIZONTAL DISTANCE ACROSS THE TRUNK AT THE LEVEL OF THE NIPPLES.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
12.91	.83	6.5%	10.7	11.4	11.7	12.3	12.9	13.5	14.1	14.5	15.3

FOUR SIZE SYSTEM (SD= .60 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
11.0	11.2	11.4	10.9	11.6	12.3	13.0
12.0	12.2	12.4	11.9	12.6	13.3	14.0
13.0	13.2	13.4	12.9	13.6	14.3	15.0

SIX SIZE SYSTEM (SD= .61 IN.)

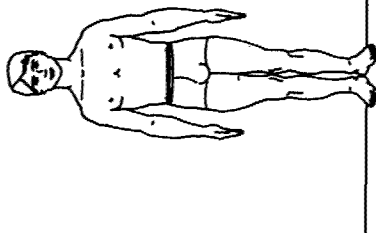
DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG
11.0	11.2	11.4	10.9	11.6	12.1	12.8	13.1	13.8	14.1	14.8	15.0	15.7
12.0	12.2	12.4	11.9	12.6	13.1	13.8	14.1	14.8	15.1	15.8	16.0	16.7
13.0	13.2	13.4	12.9	13.6	14.1	14.8	15.1	15.8	16.1	16.8	17.0	17.7

EIGHT SIZE SYSTEM (SD= .59 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
11.0	11.2	11.4	10.7	10.9	11.7	12.4	12.7	13.4	13.7	14.4	14.7	15.4	15.7	16.4	16.7	17.4
12.0	12.2	12.4	11.7	11.9	12.7	13.4	13.7	14.4	14.7	15.4	15.7	16.4	16.7	17.4	17.7	18.4
13.0	13.2	13.4	12.7	12.9	13.7	14.4	14.7	15.4	15.7	16.4	16.7	17.4	17.7	18.4	18.7	19.4

TWELVE SIZE SYSTEM (SD= .59 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
11.0	11.2	11.4	10.7	10.9	11.7	12.4	12.7	13.4	13.7	14.4	14.7	15.4	15.7	16.4	16.7	17.4
12.0	12.2	12.4	11.7	11.9	12.7	13.4	13.7	14.4	14.7	15.4	15.7	16.4	16.7	17.4	17.7	18.4
13.0	13.2	13.4	12.7	12.9	13.7	14.4	14.7	15.4	15.7	16.4	16.7	17.4	17.7	18.4	18.7	19.4



53 WAIST BREADTH

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFORT PLANE, USING A BEAM CALIPER, MEASURE THE HORIZONTAL DISTANCE ACROSS THE TRUNK AT THE LEVEL OF THE OMPHALION LANDMARK.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
12.19	.94	7.7%	9.9	10.6	10.9	11.5	12.1	12.8	13.5	13.9	14.6

FOUR SIZE SYSTEM (SD= .57 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	10.0	10.9	11.8	12.6
DESIGN MAXIMUM	10.9	11.8	12.7	13.6
	11.9	12.8	13.6	14.5

SIX SIZE SYSTEM (SD= .60 IN.)

DESIGN MINIMUM	SMALL	REGULAR	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG
SIZE MEAN	10.1	10.3	10.9	11.5	12.1	12.7	13.1	13.6	14.2	14.7
DESIGN MAXIMUM	11.0	11.3	11.9	12.5	13.1	13.6	14.2	14.7	15.3	15.8

EIGHT SIZE SYSTEM (SD= .56 IN.)

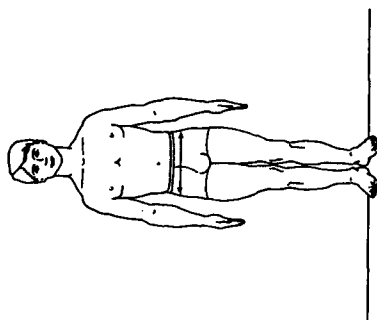
DESIGN MINIMUM	SMALL	REGULAR	SMALL	LONG	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	10.1	10.3	10.7	11.3	11.9	12.5	13.1	13.6	14.2	14.7	15.3	15.8	16.4	16.9	17.5	18.0
DESIGN MAXIMUM	11.0	11.3	11.7	12.3	12.9	13.5	14.1	14.6	15.2	15.7	16.3	16.8	17.4	17.9	18.5	19.0

TWELVE SIZE SYSTEM (SD= .55 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL	LONG	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	10.2	10.4	10.8	11.4	12.0	12.6	13.2	13.8	14.4	14.9	15.5	16.1	16.7	17.3	17.9	18.5
DESIGN MAXIMUM	11.1	11.3	11.7	12.3	12.9	13.5	14.1	14.6	15.2	15.7	16.3	16.8	17.4	17.9	18.5	19.0

54 BICRISTALE BREADTH

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFORT PLANE. USING A BEAM CALIPER AND EXERTING STRONG PRESSURE TO COMPRESS TISSUE, MEASURE THE HORIZONTAL DISTANCE BETWEEN THE CRESTS OF THE RIGHT AND LEFT ILIA AT THE MIDAXILLARY LINE.



MEAN	SD	CV	1%	5%	TOTAL SAMPLE				75%	90%	95%	99%
					10%	25%	50%	11.0				
10.99	.81	7.3%	8.7	9.5	9.9	10.4	11.0	11.6	12.1	12.4	13.1	

FOUR SIZE SYSTEM (SD= .64 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			EXTRA LARGE		
			MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
			9.1	9.7	10.3	10.1	10.7	11.3	10.9	11.5	12.1	11.9	12.5	13.1
			10.1	10.7	11.3	11.1	11.7	12.3	12.9	13.5	14.1	13.9	14.5	15.1
			11.1	11.7	12.3	12.1	12.7	13.3	13.9	14.5	15.1	14.9	15.5	16.1

SIX SIZE SYSTEM (SD= .65 IN.)

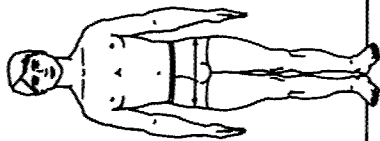
DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE		
			MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
			9.1	9.7	10.3	10.1	10.7	11.3	10.9	11.5	12.1	11.9	12.5	13.1
			10.1	10.7	11.3	11.1	11.7	12.3	12.9	13.5	14.1	13.9	14.5	15.1
			11.1	11.7	12.3	12.1	12.7	13.3	13.9	14.5	15.1	14.9	15.5	16.1

EIGHT SIZE SYSTEM (SD= .63 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE		
			MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
			9.1	9.7	10.3	10.1	10.7	11.3	10.9	11.5	12.1	11.9	12.5	13.1
			10.1	10.7	11.3	11.1	11.7	12.3	12.9	13.5	14.1	13.9	14.5	15.1
			11.1	11.7	12.3	12.1	12.7	13.3	13.9	14.5	15.1	14.9	15.5	16.1

TWELVE SIZE SYSTEM (SD= .63 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE		
			MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
			9.1	9.7	10.3	10.1	10.7	11.3	10.9	11.5	12.1	11.9	12.5	13.1
			10.1	10.7	11.3	11.1	11.7	12.3	12.9	13.5	14.1	13.9	14.5	15.1
			11.1	11.7	12.3	12.1	12.7	13.3	13.9	14.5	15.1	14.9	15.5	16.1



55 HIP BREADTH

SUBJECT STANDS ERECT, FEET TOGETHER, USING A BEAM CALIPER, MEASURE THE HORIZONTAL DISTANCE ACROSS THE WIDEST PORTION OF THE HIPS.

MEAN	SD	CV	TOTAL SAMPLE					75%	90%	95%	99%
			1%	5%	10%	25%	50%				
13.68	.74	5.3%	12.0	12.6	12.9	13.3	13.9	14.4	14.9	15.3	16.0

FOUR SIZE SYSTEM (SD= .48 IN.)

DESIGN MINIMUM		SMALL		MEDIUM		LARGE		EXTRA LARGE	
SIZE MEAN	DESIGN MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
12.3	13.1	12.1	12.9	12.6	13.6	13.5	14.3	14.2	15.0
13.1	13.9	12.9	13.7	13.6	14.4	14.5	15.1	15.0	15.8

SIX SIZE SYSTEM (SD= .50 IN.)

DESIGN MINIMUM		SMALL		REGULAR		MEDIUM		LARGE		LONG	
SIZE MEAN	DESIGN MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
12.3	13.1	12.3	13.1	13.1	13.9	13.1	13.9	13.9	14.8	13.9	14.8
13.1	13.9	13.1	13.9	13.9	14.7	13.9	14.7	14.8	15.6	14.8	15.6

EIGHT SIZE SYSTEM (SD= .48 IN.)

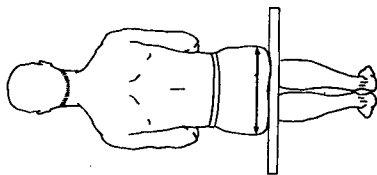
DESIGN MINIMUM		SMALL		REGULAR		MEDIUM		LARGE		LONG		X-LARGE		REGULAR		X-LARGE		LONG	
SIZE MEAN	DESIGN MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
12.1	12.9	12.1	12.9	12.1	12.9	12.8	13.6	12.8	13.6	13.5	14.3	13.5	14.3	13.5	14.3	14.2	15.0	14.2	15.0
12.9	13.7	12.9	13.7	12.9	13.7	13.6	14.4	13.6	14.4	14.3	15.1	14.3	15.1	14.3	15.1	14.2	15.0	14.2	15.0

TWELVE SIZE SYSTEM (SD= .48 IN.)

DESIGN MINIMUM		SMALL		REGULAR		MEDIUM		LARGE		SHORT		LONG		X-LARGE		SHORT		LONG	
SIZE MEAN	DESIGN MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
12.1	12.9	12.1	12.9	12.1	12.9	12.8	13.6	12.8	13.6	13.5	14.3	13.5	14.3	13.5	14.3	14.2	15.0	14.2	15.0
12.9	13.7	12.9	13.7	12.9	13.7	13.6	14.4	13.6	14.4	14.3	15.1	14.3	15.1	14.3	15.1	14.2	15.0	14.2	15.0

56 HIP BREADTH, SITTING

SUBJECT SITS, FEET RESTING ON A SURFACE ADJUSTED SO THAT THE KNEES ARE BENT AT ABOUT RIGHT ANGLES, AND THIGHS ARE PARALLEL. USING A BEAM CALIPER, MEASURE THE HORIZONTAL DISTANCE ACROSS THE WIDEST PROTRUSIONS OF THE HIPS.



MEAN	SD	CV	TOTAL SAMPLE					95%	99%
			1%	5%	10%	25%	50%		
14.88	.91	6.1%	12.6	13.3	13.6	14.2	14.8	16.2	17.4

FOUR SIZE SYSTEM (SD= .54 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL			LARGE			EXTRA LARGE		
			SMALL	MEDIUM	LARGE	SMALL	MEDIUM	LARGE	SMALL	MEDIUM	LARGE
12.7	13.6	14.5	12.7	13.6	14.5	15.4	16.3	17.2	18.1	19.0	19.9

SIX SIZE SYSTEM (SD= .57 IN.)

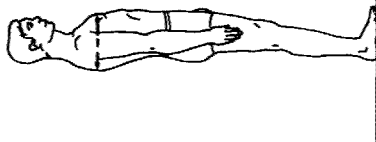
DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE		
			SMALL	REGULAR	LONG	SMALL	REGULAR	LONG	SMALL	REGULAR	LONG	SMALL	REGULAR	LONG
12.8	13.6	14.5	12.8	13.6	14.5	15.4	16.3	17.2	18.1	19.0	19.9	20.8	21.7	22.6

EIGHT SIZE SYSTEM (SD= .54 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE			X-X-LARGE		
			SMALL	REGULAR	LONG	SMALL	REGULAR	LONG	SMALL	REGULAR	LONG	SMALL	REGULAR	LONG	SMALL	REGULAR	LONG
12.8	13.6	14.5	12.8	13.6	14.5	15.4	16.3	17.2	18.1	19.0	19.9	20.8	21.7	22.6	23.5	24.4	25.3

TWELVE SIZE SYSTEM (SD= .54 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			X-LARGE			X-X-LARGE		
			SMALL	REGULAR	LONG	SMALL	REGULAR	LONG	SMALL	REGULAR	LONG	SMALL	REGULAR	LONG	SMALL	REGULAR	LONG
12.8	13.6	14.5	12.8	13.6	14.5	15.4	16.3	17.2	18.1	19.0	19.9	20.8	21.7	22.6	23.5	24.4	25.3



57 CHEST DEPTH

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFORT PLANE. WITH A BEAM CALIPER, MEASURE THE HORIZONTAL DEPTH OF THE TRUNK AT THE LEVEL OF THE NIPPLES. THE READING IS MADE AT THE POINT OF MAXIMUM QUIET INSPIRATION.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
9.65	.76	7.9%	7.6	8.2	8.6	9.1	9.6	10.3	10.8	11.1	11.6

FOUR SIZE SYSTEM (SD= .54 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
7.9	8.8	9.7	7.9	8.5	9.1	9.8
				9.4	10.0	10.6
				10.3	10.9	11.5

SIX SIZE SYSTEM (SD= .55 IN.)

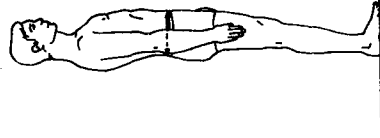
DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LONG
8.2	9.1	10.0	7.8	8.7	9.6	8.6	9.9	10.3	11.3

EIGHT SIZE SYSTEM (SD= .52 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LONG	X-LARGE	REGULAR	X-LARGE	LONG
8.0	8.9	9.7	7.6	8.5	9.4	8.3	9.2	10.2	11.1	9.0	10.0	10.9	11.7

TWELVE SIZE SYSTEM (SD= .52 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LONG	X-LARGE	REGULAR	X-LARGE	LONG
8.1	8.9	9.8	7.8	8.7	9.6	8.5	9.4	10.2	11.1	9.0	10.0	10.9	11.7



58 WAIST DEPTH

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFORT PLANE, USING A BEAM CALIPER, MEASURE THE HORIZONTAL DEPTH OF THE TRUNK AT THE LEVEL OF THE OMPHALION LANDMARK. THE READING IS MADE AT THE POINT OF MAXIMUM QUIET INSPIRATION. THE SUBJECT MUST NOT PULL IN HIS STOMACH.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
8.78	.86	9.8%	6.6	7.3	7.6	8.1	8.8	9.4	10.0	10.4	11.3

FOUR SIZE SYSTEM (SD= .61 IN.)

	SMALL	MEDIUM	LARGE	EXTRA LARGE
DESIGN MINIMUM	6.8	7.5	8.2	8.9
SIZE MEAN	7.8	8.5	9.2	9.9
DESIGN MAXIMUM	8.8	9.5	10.2	10.9

SIX SIZE SYSTEM (SD= .62 IN.)

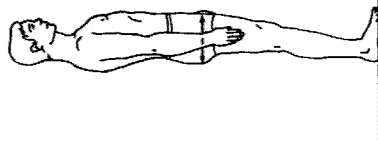
	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
DESIGN MINIMUM	7.0	7.2	6.6	8.1	7.6	8.6	9.1	8.5	8.5
SIZE MEAN	8.0	8.2	7.6	9.2	8.6	9.6	10.1	9.5	9.5
DESIGN MAXIMUM	8.9	9.3	8.7	10.2	9.6	11.1	11.1	10.5	10.5

EIGHT SIZE SYSTEM (SD= .59 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	7.0	7.2	6.5	7.7	7.2	8.5	8.0	8.5	9.2	8.7	8.7	8.7
SIZE MEAN	8.0	8.2	7.4	8.7	8.2	9.5	8.9	8.9	10.2	9.7	9.7	9.7
DESIGN MAXIMUM	8.9	9.3	8.4	9.7	9.2	10.4	9.9	9.9	11.2	10.7	10.7	10.7

TWELVE SIZE SYSTEM (SD= .58 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	7.1	7.3	6.4	7.8	7.5	8.6	8.2	8.2	9.3	8.7	8.7	8.7
SIZE MEAN	8.0	8.2	7.3	8.8	8.4	9.5	9.2	8.9	10.3	9.0	9.0	9.0
DESIGN MAXIMUM	9.0	9.3	8.3	9.7	9.4	10.5	10.2	9.8	11.3	10.9	10.9	10.6



59 BUTTOCK DEPTH

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFORT PLANE, USING A BEAM CALIPER, MEASURE THE HORIZONTAL DEPTH OF THE TRUNK AT THE LEVEL OF THE MAXIMUM PROTRUSION OF THE BUTTOCKS.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
9.44	.81	8.6%	7.5	8.0	8.3	8.8	9.4	10.0	10.6	11.0	11.5

FOUR SIZE SYSTEM (SD= .53 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	7.5	8.3	9.0	9.7
DESIGN MAXIMUM	8.4	9.1	9.9	10.6
	9.3	10.0	10.7	11.4

SIX SIZE SYSTEM (SD= .54 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL	LONG	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG
SIZE MEAN	7.7	7.9	8.3	8.4	8.9	9.3	9.8	10.2	10.7	11.6	10.7	9.3
DESIGN MAXIMUM	8.5	8.8	9.2	9.3	9.8	10.2	10.7	11.1	11.6	12.1	11.1	10.2

EIGHT SIZE SYSTEM (SD= .51 IN.)

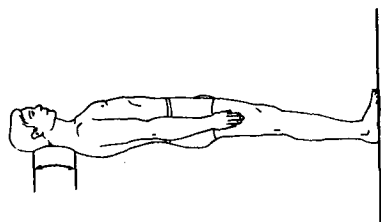
DESIGN MINIMUM	SMALL	REGULAR	SMALL	LONG	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	7.7	7.9	8.3	8.4	8.9	9.3	9.8	10.2	10.7	11.6	10.7	9.3	10.0	10.8	11.7	10.4
DESIGN MAXIMUM	8.5	8.8	9.2	9.3	9.8	10.2	10.7	11.1	11.6	12.1	11.1	10.2	10.8	11.2	11.7	10.4

TWELVE SIZE SYSTEM (SD= .50 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL	LONG	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	7.7	7.9	8.3	8.4	8.9	9.3	9.8	10.2	10.7	11.6	10.7	9.3	10.0	10.8	11.7	10.4
DESIGN MAXIMUM	8.5	8.8	9.2	9.3	9.8	10.2	10.7	11.1	11.6	12.1	11.1	10.2	10.8	11.2	11.7	10.4

60 POSTERIOR NECK CURVATURE

SUBJECT STANDS ERECT, HIS HEAD IN THE FRANKFORT PLANE. USING THE TAPE, MEASURE THE SURFACE DISTANCE FROM THE CERVICALE LANDMARK TO THE INION LANDMARK.



MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
5.22	.66	12.7%	3.5	3.9	4.2	4.7	5.2	5.7	6.2	6.4	7.1

FOUR SIZE SYSTEM (SD= .66 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
	4.1	4.1	4.1	4.1
	5.2	5.2	5.2	5.2
	6.3	6.3	6.3	6.3

SIX SIZE SYSTEM (SD= .65 IN.)

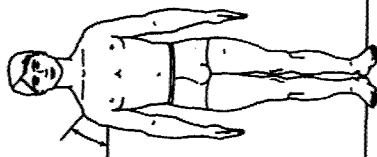
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
	3.9	3.9	4.4	3.9	4.9	4.3	3.8	3.8	4.3
	5.0	5.0	5.5	4.9	5.4	5.4	4.9	5.3	5.3
	6.1	6.1	6.5	6.0	6.5	6.5	6.0	6.4	6.4

EIGHT SIZE SYSTEM (SD= .65 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
	4.0	4.0	4.4	3.9	4.4	3.9	4.3	4.3	3.9	4.3	4.3	4.3
	5.0	5.0	5.5	5.0	5.4	5.0	5.4	5.4	5.0	5.4	5.4	5.4
	6.1	6.1	6.5	6.1	6.5	6.1	6.5	6.5	6.0	6.4	6.4	6.4

TWELVE SIZE SYSTEM (SD= .64 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL SHORT	SMALL REGULAR	SMALL LONG	MEDIUM SHORT	MEDIUM REGULAR	MEDIUM LONG	LARGE SHORT	LARGE REGULAR	LARGE LONG	X-LARGE SHORT	X-LARGE REGULAR	X-LARGE LONG
	3.9	4.2	4.5	3.9	4.2	4.4	3.9	4.1	4.4	3.8	4.1	4.4
	5.0	5.2	5.5	4.9	5.2	5.5	4.9	5.2	5.5	4.9	5.2	5.4
	6.0	6.3	6.6	6.0	6.3	6.6	6.0	6.2	6.5	5.9	6.2	6.5



(61) DELTOID CURVATURE

SUBJECT STANDS ERECT, HIS ARMS HANGING NATURALLY AT HIS SIDES, USING THE TAPE, MEASURE THE SURFACE DISTANCE FROM THE RIGHT ACROMIAL LANDMARK TO THE RIGHT DELTOID LANDMARK BELOW.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
6.26	.52	8.4%	4.7	5.3	5.5	5.8	6.2	6.6	7.1	7.4	7.8

FOUR SIZE SYSTEM (SD= .49 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	5.1	5.3	5.6	5.8
DESIGN MAXIMUM	5.9	6.1	6.4	6.6
	6.7	7.0	7.2	7.4

SIX SIZE SYSTEM (SD= .48 IN.)

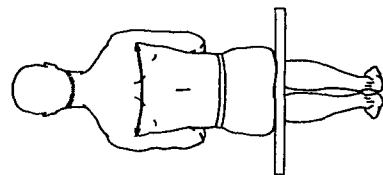
DESIGN MINIMUM	SMALL	REGULAR	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG
SIZE MEAN	5.0	5.4	5.2	5.5	5.6	5.8	5.5	5.8	5.8	5.8
DESIGN MAXIMUM	5.8	6.2	6.0	6.3	6.4	6.6	6.3	6.6	6.6	6.6
	6.6	7.0	6.8	7.1	7.2	7.4	7.1	7.4	7.4	7.4

EIGHT SIZE SYSTEM (SD= .48 IN.)

DESIGN MINIMUM	SMALL	REGULAR	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	5.0	5.4	5.2	5.5	5.6	5.8	5.4	5.7	5.7	5.9	5.6	5.9	5.9	5.9
DESIGN MAXIMUM	5.8	6.2	6.0	6.3	6.4	6.6	6.2	6.5	6.5	6.7	6.4	6.7	6.7	6.7
	6.6	6.9	6.8	7.1	7.2	7.4	7.0	7.3	7.3	7.5	7.2	7.5	7.5	7.5

TWELVE SIZE SYSTEM (SD= .48 IN.)

DESIGN MINIMUM	SMALL	REGULAR	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	SHORT	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	5.0	5.4	5.2	5.5	5.6	5.8	5.3	5.6	5.8	5.8	5.5	5.5	5.5	5.8	5.8	6.0
DESIGN MAXIMUM	5.8	6.2	6.0	6.3	6.4	6.6	6.1	6.4	6.6	6.6	6.3	6.3	6.3	6.5	6.5	6.8
	6.6	6.9	6.8	7.0	7.2	7.4	6.9	7.1	7.4	7.4	7.1	7.1	7.1	7.3	7.3	7.6



62 INTERSCYE CURVATURE

SUBJECT SITS ERECT, HIS UPPER ARMS HANGING AT HIS SIDES AND HIS FOREARMS EXTENDED HORIZONTALLY, WITH THE TAPE FOLLOWING THE CURVATURE OF THE BACK, MEASURE THE SURFACE DISTANCE BETWEEN THE RIGHT AND LEFT SCYE LANDMARKS.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
15.26	1.48	9.7%	11.6	12.7	13.3	14.2	15.3	16.3	17.2	17.8	18.8

FOUR SIZE SYSTEM (SD=1.38 IN.)

	SMALL	MEDIUM	LARGE	EXTRA LARGE
DESIGN MINIMUM	12.1	12.7	13.4	14.0
SIZE MEAN	14.3	15.0	15.6	16.3
DESIGN MAXIMUM	16.6	17.3	17.9	18.5

SIX SIZE SYSTEM (SD=1.38 IN.)

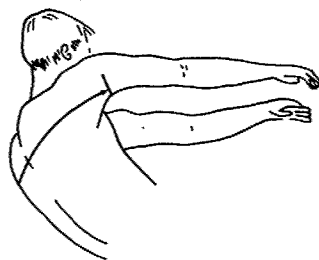
	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
DESIGN MINIMUM	12.2	12.4	12.0	13.2	12.9	14.1	14.1	13.7	13.7
SIZE MEAN	14.4	14.7	14.3	15.5	15.1	16.4	16.4	16.0	16.0
DESIGN MAXIMUM	16.7	17.0	16.6	17.8	17.4	18.6	18.6	18.3	18.3

EIGHT SIZE SYSTEM (SD=1.37 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	12.2	12.4	11.8	12.9	12.9	12.5	13.2	13.2	14.2	14.2	13.9	13.9
SIZE MEAN	14.4	14.7	14.1	15.1	15.1	14.8	15.5	15.5	16.5	16.5	16.1	16.1
DESIGN MAXIMUM	16.7	17.0	16.4	17.4	17.4	17.0	17.7	17.7	18.8	18.8	18.4	18.4

TWELVE SIZE SYSTEM (SD=1.37 IN.)

	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	SHORT	X-LARGE	REGULAR	X-LARGE LONG
DESIGN MINIMUM	12.2	12.4	11.8	12.9	12.9	12.5	13.4	13.4	13.1	13.1	14.3	14.1	13.8	13.8
SIZE MEAN	14.5	14.7	14.0	15.2	15.2	14.7	15.6	15.6	15.4	15.4	16.5	16.3	16.1	16.1
DESIGN MAXIMUM	16.8	17.0	16.3	17.4	17.4	17.0	17.9	17.9	17.7	17.7	18.8	18.6	18.4	18.4



(83) INTERSCYE CURVATURE, MAXIMUM

SUBJECT STANDS WITH HIS TORSO FLEXED ABOUT 90 DEGREES AND HIS ARMS RELAXED IN A DOWNWARD POSITION. USING THE TAPE, MEASURE THE SURFACE DISTANCE ACROSS THE BACK FROM THE LEFT TO THE RIGHT SCYE LANDMARKS.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
24.23	1.19	4.9%	21.1	22.2	22.7	23.4	24.2	25.0	25.8	26.3	27.1

TOTAL SAMPLE

FOUR SIZE SYSTEM (SD= .91 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	21.3	22.3	23.3	24.2
DESIGN MAXIMUM	22.6	23.6	24.6	25.7
	24.3	25.3	26.3	27.2

SIX SIZE SYSTEM (SD= .92 IN.)

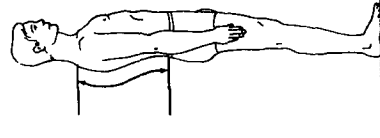
DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
SIZE MEAN	21.2	21.5	21.8	22.6	22.6	22.9	23.7	23.7	24.0
DESIGN MAXIMUM	22.7	23.0	23.3	24.1	24.1	24.4	25.2	25.2	25.5
	24.2	24.5	24.8	25.6	25.6	25.9	26.7	26.7	27.0

EIGHT SIZE SYSTEM (SD= .90 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	21.2	21.5	21.8	22.4	22.4	22.9	23.1	23.1	23.4	24.1	24.1	24.3
DESIGN MAXIMUM	22.7	23.0	23.3	23.9	23.9	24.6	24.6	24.6	24.9	25.5	25.5	25.8
	24.2	24.5	24.8	25.4	25.4	26.1	26.1	26.1	26.3	27.0	27.0	27.3

TWELVE SIZE SYSTEM (SD= .90 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	SHORT	X-LARGE REGULAR	X-LARGE LONG
SIZE MEAN	21.2	21.5	21.8	22.5	22.5	23.1	23.1	23.1	23.4	24.0	24.0	24.2	24.4
DESIGN MAXIMUM	22.7	23.0	23.3	23.8	23.8	24.6	24.6	24.6	24.9	25.5	25.5	25.7	25.8
	24.2	24.5	24.8	25.4	25.4	26.0	26.0	26.0	26.2	27.0	27.0	27.2	27.3



64) WAIST BACK CURVATURE

SUBJECT STANDS ERECT. USING THE TAPE, MEASURE THE SURFACE DISTANCE FROM THE CERVICAL LANDMARK TO THE OMPHALION WAIST BACK LANDMARK.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
18.47	.93	5.1%	16.2	16.8	17.2	17.8	18.5	19.2	19.8	20.2	20.9

FOUR SIZE SYSTEM (SD= .83 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
16.1	17.4	18.7	16.3	16.8	17.4	17.9
17.4	18.7	19.7	17.6	18.2	18.7	19.3
18.7	19.7		19.0	19.6	20.1	20.7

SIX SIZE SYSTEM (SD= .80 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG
16.0	17.3	18.6	16.1	17.4	18.7	19.7	17.1	18.4	19.4	20.7
17.3	18.6		18.1	19.4	20.7		19.1	20.4		
18.6			19.1	20.4			20.1			

EIGHT SIZE SYSTEM (SD= .79 IN.)

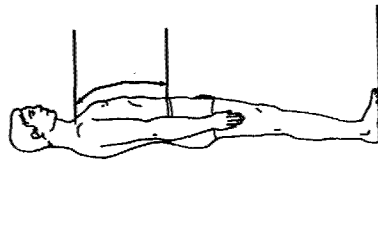
DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
16.0	17.3	18.6	16.1	17.4	18.7	19.7	17.1	18.4	19.4	20.7	17.4	18.7	19.6	20.9
17.3	18.6		18.1	19.4	20.7		19.1	20.4			18.1	19.4	20.4	
18.6			19.1	20.4			20.1				18.4	19.7	20.9	

TWELVE SIZE SYSTEM (SD= .76 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
16.0	17.3	18.6	16.1	17.4	18.7	19.7	17.1	18.4	19.4	20.7	17.4	18.7	19.6	20.9
17.3	18.6		18.1	19.4	20.7		19.1	20.4			18.1	19.4	20.4	
18.6			19.1	20.4			20.1				18.4	19.7	20.9	

65 WAIST FRONT CURVATURE

SUBJECT STANDS ERECT. USING THE TAPE, MEASURE THE SURFACE DISTANCE FROM THE SUPRASTERNAL LANDMARK TO THE CENTER OF THE UMBILICUS.



MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
15.91	.87	5.5%	13.7	14.4	14.7	15.3	15.9	16.5	17.2	17.6	18.4

FOUR SIZE SYSTEM (SD= .73 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
13.7	14.9	16.1	13.8	14.4	15.0	15.7
14.0	15.2	16.4	15.0	15.6	16.2	16.9
15.1	16.3	17.5	16.2	16.8	17.4	18.1

SIX SIZE SYSTEM (SD= .73 IN.)

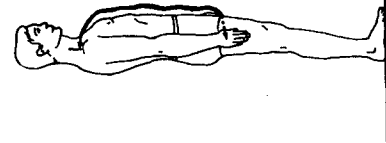
DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG
13.7	14.9	16.1	13.9	14.6	15.3	16.0	16.7	17.4	18.1	18.8
14.0	15.2	16.4	14.2	14.9	15.6	16.3	17.0	17.7	18.4	19.1
15.1	16.3	17.5	15.4	16.1	16.8	17.5	18.2	18.9	19.6	20.3

EIGHT SIZE SYSTEM (SD= .72 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
13.7	14.9	16.1	13.7	14.4	15.1	15.8	16.5	17.2	17.9	18.6	19.3	20.0	20.7	21.4
14.0	15.2	16.4	14.0	14.7	15.4	16.1	16.8	17.5	18.2	18.9	19.6	20.3	21.0	21.7
15.1	16.3	17.5	15.1	15.8	16.5	17.2	17.9	18.6	19.3	20.0	20.7	21.4	22.1	22.8

TWELVE SIZE SYSTEM (SD= .72 IN.)

DESIGN MINIMUM	DESIGN MEAN	DESIGN MAXIMUM	SMALL	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
13.7	14.9	16.1	13.7	14.4	15.1	15.8	16.5	17.2	17.9	18.6	19.3	20.0	20.7	21.4
14.0	15.2	16.4	14.0	14.7	15.4	16.1	16.8	17.5	18.2	18.9	19.6	20.3	21.0	21.7
15.1	16.3	17.5	15.1	15.8	16.5	17.2	17.9	18.6	19.3	20.0	20.7	21.4	22.1	22.8



66 CROTCH (SCROTAL)-TO-MIDSHOULDER LEVEL CURVATURE, ANTERIOR

SUBJECT STANDS ERECT, HIS ARMS RELAXED AT HIS SIDES AND LEGS SLIGHTLY APART. PLACE THE HEAD OF THE MEASURING DEVICE AT THE SCROTAL-PERINEAL JUNCTURE. PASSING THE TAPE THROUGH THE CROTCH TO THE RIGHT OF THE SCROTUM, MEASURE THE SURFACE DISTANCE FROM THE SCROTAL-PERINEAL JUNCTURE TO THE LANDMARK AT MIDSHOULDER ALONG THE ANTERIOR PORTION OF THE TORSO.

MEAN	SD	CV	TOTAL SAMPLE					90%	95%	99%
			5%	10%	25%	50%	75%			
30.45	1.47	4.8%	27.1	28.0	28.5	29.4	30.4	31.4	33.0	34.3

FOUR SIZE SYSTEM (SD=1.05 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		EXTRA LARGE	
	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG
	26.8	27.6	28.1	28.4	29.4	29.7	30.7	30.7
	28.5	29.4	29.8	30.1	31.2	31.5	32.5	32.5
	30.3	31.1	31.6	31.8	32.9	33.3	34.2	34.2

SIX SIZE SYSTEM (SD=1.05 IN.)

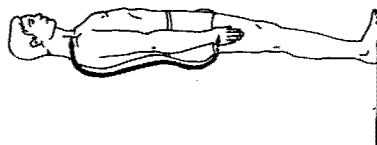
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		X-LARGE		X-LARGE LONG	
	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG
	26.6	27.3	28.4	29.1	29.8	30.5	31.0	31.0	31.0	31.0
	28.3	28.9	30.1	30.8	31.5	32.3	32.0	32.7	32.7	32.7
	30.0	30.6	31.8	32.6	33.3	34.0	33.7	34.4	34.4	34.4

EIGHT SIZE SYSTEM (SD=1.03 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		X-LARGE		X-LARGE LONG	
	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG
	26.6	27.3	28.5	29.1	29.7	30.3	30.3	31.0	31.0	31.0
	28.3	28.9	30.2	30.8	31.4	32.0	32.0	32.7	32.7	32.7
	30.0	30.6	31.9	32.5	33.1	33.7	33.7	34.4	34.4	34.4

TWELVE SIZE SYSTEM (SD=1.02 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		X-LARGE		X-LARGE LONG	
	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG	REGULAR	LONG
	26.5	27.4	28.2	29.0	29.4	29.9	30.2	30.7	31.1	31.1
	28.2	29.1	29.9	30.7	31.1	31.5	31.9	32.3	32.8	32.8
	29.9	30.7	31.5	32.3	32.8	33.2	33.6	34.0	34.5	34.5



(67) CROTCH (SCROTAL)-TO-MIDSHOULDER CURVATURE, OVER BUTTOCK

SUBJECT STANDS ERECT, HIS ARMS RELAXED AT HIS SIDES AND HIS LEGS SET SLIGHTLY APART. PLACE THE HEAD OF THE MEASURING DEVICE AT THE SCROTAL-PERINEAL JUNCTURE, PASSING THE TAPE POSTERIORLY THROUGH THE CROTCH, OVER THE RIGHT BUTTOCK, AND ALONG THE BACK OF THE TORSO, MEASURE THE SURFACE DISTANCE FROM THE SCROTAL-PERINEAL JUNCTURE TO THE MIDSHOULDER LANDMARK.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
36.00	1.64	4.5%	32.3	33.3	33.8	34.8	35.9	37.1	38.2	38.6	40.0

FOUR SIZE SYSTEM (SD=1.19 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	31.9	33.4	34.8	36.2
DESIGN MAXIMUM	33.9	35.3	36.8	38.2
	35.9	37.3	38.7	40.2

SIX SIZE SYSTEM (SD=1.19 IN.)

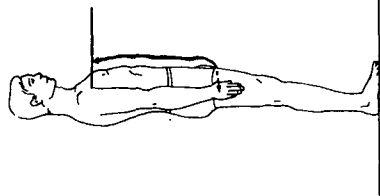
DESIGN MINIMUM	SMALL	REGULAR	MEDIUM	REGULAR	MEDIUM	LONG	LARGE	REGULAR	LARGE	LONG
SIZE MEAN	31.7	32.0	32.9	33.6	34.5	35.2	36.1	37.1	38.0	40.0
DESIGN MAXIMUM	33.6	34.0	34.9	35.6	36.5	37.1	38.2	39.1	40.0	
	35.5	36.0	36.9	37.5	38.4	39.1	40.0			

EIGHT SIZE SYSTEM (SD=1.16 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL	LONG	MEDIUM	REGULAR	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	31.7	32.5	33.0	33.8	34.4	35.2	35.7	36.5	37.1	37.6	38.5	39.5	40.4	
DESIGN MAXIMUM	33.6	34.4	35.0	35.8	36.3	37.1	37.6	38.5	39.0	39.6	40.4			
	35.5	36.3	36.9	37.7	38.2	39.0	39.6							

TWELVE SIZE SYSTEM (SD=1.15 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL	LONG	MEDIUM	REGULAR	LARGE	REGULAR	LARGE	LONG	X-LARGE	REGULAR	X-LARGE	LONG
SIZE MEAN	31.6	32.1	32.6	33.5	34.0	34.8	35.3	36.2	37.2	38.1	39.1	39.9	40.5	
DESIGN MAXIMUM	33.5	34.0	34.5	35.4	35.9	36.7	37.3	38.1	39.1	39.9	40.5			
	35.4	35.9	36.4	37.3	37.8	38.6	39.1	39.9	40.5					



68 CROTCH (SCROTAL)-TO-ANTERIOR SCYE LEVEL CURVATURE

SUBJECT STANDS ERECT, HIS ARMS RELAXED AT HIS SIDES AND HIS LEGS SET SLIGHTLY APART. PLACE THE HEAD OF THE MEASURING DEVICE AT THE SCROTAL-PERINEAL JUNCTURE, PASSING THE TAPE THROUGH THE CROTCH TO THE RIGHT OF THE SCROTUM, MEASURE THE SURFACE DISTANCE FROM THE SCROTAL-PERINEAL JUNCTURE TO THE ANTERIOR SCYE LEVEL LAND-MARK IN THE MIDLINE OF THE TORSO.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
21.18	1.23	5.8%	18.5	19.1	19.5	20.2	21.1	22.0	22.9	23.4	24.5

FOUR SIZE SYSTEM (SD=1.02 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	18.2	19.1	20.0	20.9
DESIGN MAXIMUM	19.9	20.8	21.6	22.5
	21.5	22.4	23.3	24.2

SIX SIZE SYSTEM (SD=1.01 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
SIZE MEAN	18.0	18.7	19.0	19.1	20.8	19.9	20.0	21.7	20.8
DESIGN MAXIMUM	21.2	20.3	20.6	20.8	22.4	21.6	21.7	23.4	22.5
		22.0	22.3			23.2			24.2

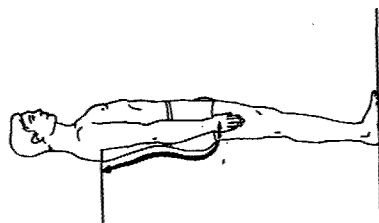
EIGHT SIZE SYSTEM (SD=1.00 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	18.0	18.7	19.0	18.8	19.5	19.6	20.3	22.0	20.4	21.1	20.8	21.3
DESIGN MAXIMUM	21.2	20.3	20.6	20.4	21.1	21.2	22.0	23.6	23.7	24.4	22.9	24.5
		22.0	22.1		22.8	22.9						

TWELVE SIZE SYSTEM (SD= .99 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	17.9	18.3	18.8	18.7	19.2	19.6	20.0	20.4	20.4	20.3	20.8	21.3
DESIGN MAXIMUM	21.1	20.0	20.4	20.3	20.6	21.3	21.6	23.7	23.7	21.9	22.4	24.0
		21.6	22.1	21.9	22.4	22.9	23.2			23.6	24.0	24.5

69 CROTCH (SCROTAL)-TO-POSTERIOR SCYE LEVEL CURVATURE



SUBJECT STANDS ERECT, HIS ARMS RELAXED AT HIS SIDES AND LEGS SET SLIGHTLY APART. PLACE THE CENTER OF THE HEAD OF THE MEASURING DEVICE AT THE SCROTAL-PERINEAL JUNCTURE, PASSING THE TAPE POSTERIORLY THROUGH THE CROTCH, MEASURE THE SURFACE DISTANCE FROM THE SCROTAL-PERINEAL JUNCTURE TO THE LANDMARK AT SCYE LEVEL ON THE BACK ALONG THE MIDLINE OF THE TORSO.

MEAN	SD	CV	1%	5%	10%	25%	50%	75%	90%	95%	99%
24.47	1.40	5.7%	21.0	22.1	22.6	23.5	24.5	25.5	26.4	26.9	27.9

FOUR SIZE SYSTEM (SD=1.12 IN.)

DESIGN MINIMUM	SMALL	MEDIUM	LARGE	EXTRA LARGE
SIZE MEAN	21.1	22.1	23.2	24.3
DESIGN MAXIMUM	22.9	24.0	25.0	26.1
	24.8	25.8	26.9	28.0

SIX SIZE SYSTEM (SD=1.13 IN.)

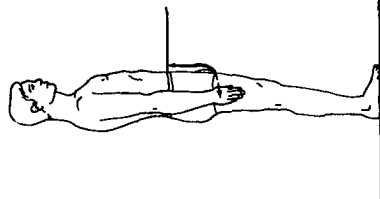
DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG
SIZE MEAN	20.9	21.2	21.7	22.3	22.4	22.9	23.5	23.5	24.1
DESIGN MAXIMUM	22.7	23.0	23.6	24.2	24.7	24.8	25.4	25.4	26.0
	24.6	24.9	25.4	26.1	26.6	26.5	27.2	27.2	27.8

EIGHT SIZE SYSTEM (SD=1.11 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	20.8	21.4	21.9	22.4	22.4	22.9	23.4	23.4	23.9	24.4	24.4	24.4
DESIGN MAXIMUM	22.6	23.2	23.7	24.2	24.7	24.7	25.3	25.3	25.8	26.3	26.3	26.3
	24.5	25.1	25.6	26.1	26.6	26.6	27.1	27.1	27.6	28.1	28.1	28.1

TWELVE SIZE SYSTEM (SD=1.11 IN.)

DESIGN MINIMUM	SMALL	REGULAR	SMALL LONG	MEDIUM	REGULAR	MEDIUM LONG	LARGE	REGULAR	LARGE LONG	X-LARGE	REGULAR	X-LARGE LONG
SIZE MEAN	20.8	21.2	21.8	22.2	22.2	22.8	23.2	23.2	23.8	24.2	24.2	24.2
DESIGN MAXIMUM	22.6	23.0	23.6	24.0	24.3	24.7	25.0	25.0	25.3	25.7	26.0	26.4
	24.5	24.8	25.1	25.8	26.2	26.5	26.8	26.8	27.2	27.5	27.8	28.2



70 CROTCH (SCROTAL)-TO-ANTERIOR WAIST LEVEL CURVATURE

SUBJECT STANDS ERECT, HIS ARMS RELAXED AT HIS SIDES AND HIS LEGS SET SLIGHTLY APART. PLACE THE HEAD OF THE MEASURING DEVICE AT THE SCROTAL-PERINEAL JUNCTURE, PASSING THE TAPE THROUGH THE CROTCH TO THE RIGHT OF THE SCROTUM, MEASURE THE SURFACE DISTANCE FROM THE SCROTAL-PERINEAL JUNCTURE TO THE ANTERIOR WAIST LANDMARK IN THE MIDLINE OF THE TORSO.

MEAN	SD	CV	TOTAL SAMPLE					90%	95%	99%
			1%	5%	10%	25%	50%			
11.19	.81	7.2%	9.2	9.8	10.1	10.5	11.1	11.7	12.3	13.5

FOUR SIZE SYSTEM (SD= .72 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			EXTRA LARGE		
	REGULAR	SMALL	LONG	REGULAR	SMALL	LONG	REGULAR	SMALL	LONG	REGULAR	SMALL	LONG
	9.3	9.3	9.7	9.8	9.8	10.3	10.3	10.7	10.7	10.7	10.7	10.7
	10.5	10.5	10.9	11.0	11.0	11.4	11.4	11.9	11.9	11.9	11.9	11.9
	11.7	11.7	12.0	12.1	12.1	12.6	12.6	13.1	13.1	13.1	13.1	13.1

SIX SIZE SYSTEM (SD= .72 IN.)

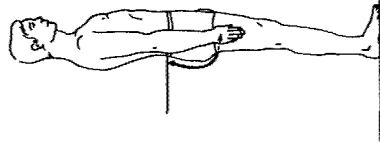
DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		REGULAR		MEDIUM		LONG		LARGE		REGULAR		LARGE		LONG	
	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL
	9.3	9.3	9.3	9.7	9.8	9.8	10.2	10.2	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3
	10.5	10.5	10.5	10.9	11.0	11.0	11.4	11.4	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
	11.7	11.7	11.7	12.0	12.1	12.1	12.5	12.5	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7

EIGHT SIZE SYSTEM (SD= .71 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		REGULAR		MEDIUM		LONG		LARGE		REGULAR		LARGE		REGULAR		X-LARGE		X-LARGE		LONG	
	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	SMALL	REGULAR	
	9.2	9.2	9.2	9.5	9.6	9.6	10.1	10.1	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	
	10.4	10.4	10.4	10.7	10.8	10.8	11.1	11.1	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	
	11.5	11.5	11.5	11.9	12.0	12.0	12.3	12.3	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	

TWELVE SIZE SYSTEM (SD= .71 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		REGULAR		MEDIUM		LONG		LARGE		REGULAR		LARGE		REGULAR		X-LARGE		X-LARGE	
	SMALL SHORT	SMALL REGULAR	SMALL LONG	SMALL REGULAR	MEDIUM SHORT	MEDIUM REGULAR	MEDIUM LONG	MEDIUM LONG	LARGE SHORT	LARGE REGULAR	LARGE SHORT	LARGE REGULAR	X-LARGE SHORT	X-LARGE REGULAR	X-LARGE SHORT	X-LARGE REGULAR	X-LARGE SHORT	X-LARGE REGULAR	X-LARGE SHORT	X-LARGE REGULAR
	9.1	9.4	9.6	9.8	9.6	9.8	10.0	10.0	10.0	10.2	10.0	10.2	10.5	10.2	10.5	10.7	10.9	10.9	10.9	10.9
	10.3	10.5	10.8	11.0	10.8	11.0	11.2	11.2	11.2	11.4	11.0	11.4	11.6	11.4	11.6	11.9	12.1	12.1	12.1	12.1
	11.5	11.7	11.9	12.1	11.9	12.1	12.4	12.4	12.4	12.6	12.2	12.6	12.8	12.6	12.8	13.0	13.2	13.2	13.2	13.2



71 CROTCH (SCROTAL)-TO-WAIST LEVEL CURVATURE, OVER BUTTOCK

SUBJECT STANDS ERECT, HIS ARMS RELAXED AT HIS SIDES AND HIS LEGS SET SLIGHTLY APART. PLACE THE HEAD OF THE MEASURING DEVICE AT THE SCROTAL-PERINEAL JUNCTURE, PASSING THE TAPE POSTERIORLY THROUGH THE CROTCH AND OVER THE RIGHT BUTTOCK, MEASURE THE SURFACE DISTANCE FROM THE SCROTAL-PERINEAL JUNCTURE TO THE WAIST LAND-MARK ON THE BACK OF THE TORSO.

MEAN	SD	CV	TOTAL SAMPLE					95%	99%
			5%	10%	25%	50%	75%		
16.78	1.19	7.1%	13.9	14.9	15.2	15.9	16.7	17.6	18.9

FOUR SIZE SYSTEM (SD= .98 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL			MEDIUM			LARGE			EXTRA LARGE		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
	13.9	14.0	14.1	14.8	14.8	14.8	15.6	15.6	15.6	16.4	16.4	16.4

SIX SIZE SYSTEM (SD=1.00 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		EXTRA LARGE	
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
	13.9	14.1	14.8	15.1	15.6	16.1	16.4	16.7

EIGHT SIZE SYSTEM (SD= .98 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		EXTRA LARGE	
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
	13.9	14.1	14.8	15.1	15.6	16.1	16.4	16.7

TWELVE SIZE SYSTEM (SD= .98 IN.)

DESIGN MINIMUM SIZE MEAN DESIGN MAXIMUM	SMALL		MEDIUM		LARGE		EXTRA LARGE	
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
	13.9	14.1	14.8	15.1	15.6	16.1	16.4	16.7

SECTION V

SELECTION OF THE APPROPRIATE SIZING PROGRAM

The goal of any sizing program is to achieve a good fit for maximum numbers of people with the minimum number of sizes. To this end, we offer the highly cost-effective four- and six-size systems and, at the other end of the spectrum, the better-fitting eight- and 12-size schemes. It goes without saying that less than four sizes could not reasonably be expected to cover a population which spans 145 pound differences in weight and 15 inch differences in height. On the other hand, while one could expand considerably beyond 12 sizes using more and more discrete categories of height and weight, both statistics and experience show that, in fact, the increase in the number of sizes much beyond 12 has limited usefulness in terms of improved fit and significant penalties in terms of cost and logistics. Decreased sizing benefits from increases in size categories occur because of the less than perfect relationships between the key sizing dimensions and all the other dimensional variables built into a garment. That is, a size for every inch of height (instead of every three inches) and every 10 pounds of weight (instead of every 25 pounds) would not necessarily improve the quality of the fit at waist or ankle.

It will be noted by readers studying the four sizing programs that weight categories are very similar for all of them. Only the six-size program deviates somewhat from the 25-pound increments used in the others. The factor which chiefly differentiates the four systems is an increasing variation in height increments associated with each of the weight categories. This occurs because girths and other fleshy body dimensions highly correlated with weight are somewhat flexible and deformable and, in addition, are not expected to be snugly fitted by a large variety of protective garments. Height related dimensions, on the other hand, are much more inflexible. Thus, trousers, in most cases, are not expected to conform to the contours of the leg; many materials will provide some "give" around hips or chest. By comparison, a trouser leg can be too short but even a half-inch too long means it will be stepped on; a half-inch too little in a crotch measurement can be untenable.

Given the impetus toward the least number of sizes as a constant, the selection of an appropriate sizing system will depend largely on two factors: the need for a close fit, and the adjustability built into the garment.

Since the design values for a given dimension are likely to fall near the upper or lower limits of each size range (as explained in Section II), it is incumbent upon the designer to study the ranges given for the dimensions of importance and decide whether the smaller or larger persons in the size range will be

functionally fitted by a waist height or neck circumference considerably at variance with their body sizes. Considering the chest girth of a flight coverall, for example, the designer may consult the data presented in the four-size system. The design value for chest girth for such a garment would be based on measurements found in the upper right hand sections of each size category so as to accommodate the largest persons in that group. The question to be answered by the designer is whether a garment cut for a chest circumference of some 40.45 inches ("medium" in the four-size system) could also be worn by persons with chest girths of 35.22 inches (represented by data in the lower left-hand area of the size category). Naturally, it would be somewhat large for such persons, but would it work? It is up to the designer to decide which variables are the dimensions of importance. In some cases girths will be more significant than heights; in other garments, close fit around the neck, wrists and ankles will assume importance. Often, the designer will wish to focus on sitting dimensions to achieve an optimum fit in a garment chiefly worn by a seated operator.

In general, loose protective garments designed to cover other clothing, such as flight coveralls, disposable chemical defense coveralls or exposure suits are candidates for the four- and six-size programs.

For partial or full pressure suits or one-piece Nomex flight suits, an eight- or 12-size program will probably be necessary. The partial pressure garments exert counter pressure to the body and body segments through the tension of the material and a series of air filled bladders and must, therefore, conform closely to the body size to be effective. Lacings are provided to take up some of the garment girths to provide for optimum conformity to the wearer's size variability. In the full pressure suit, gas pressure is applied evenly over the whole body with the suit acting as an anthropomorphic external shell. The suit does not, therefore, need to follow the contours of the body as closely as the partial pressure suit and the lacings for girth adjustment found in the partial pressure suit can be dispensed with. However, lacing systems are frequently employed between the joints in the full pressure suit to adjust the suit for variation in body segment lengths.

Adjustability will play a major role in the choice of sizing systems. Lacing and inflation, as mentioned above, are commonly incorporated in pressure suits. Further means of designing adjustability into these and other protective garments are limited only by the inventiveness of designers; traditionally they include elastic encircling waist, wrist or ankle girths and alternate fasteners. Even the type of material used will have some effect on the fit tolerances of the garment. In the case of one RAF chemical defense undergarment, arms and legs were cut at maximum length and designed to be sheared off by individual wearers to provide a "custom" fit. Such a feature might be sufficient to

reduce the need from six to four sizes for a comparable disposable protective USAF garment.

Selection of an appropriate sizing program, then, is based on the designer's understanding of how closely the end item must fit and, alternatively, how much leeway can be allowed without compromising the garment's protective capacity or the wearer's functioning. It will be based on his knowledge of the adjustability of the garment and the range of body sizes such adjustment will accommodate. And, finally, it will depend on a careful study of the sizing program itself with a discriminating eye toward within-a-size variability for dimensions of importance.

APPENDIX

DEFINITION OF TERMS

Abduct: to move away from the axis of the body or one of its parts.

Acromiale: the most lateral point of the lateral edge of the spine of the shoulder blade; the tip of the shoulder.

Ankle landmark: a mark placed on the medial side of the ankle at the level of its minimum circumference.

Anterior: pertaining to the front of the body; opposed to posterior.

Biceps: the large muscle on the anterior surface of the upper arm.

Buttock landmark: a mark placed on the maximum posterior protrusion of the right buttock.

Calf landmark: a mark placed on the medial side of the calf at the level of its maximum circumference.

Cervicale: the protrusion of the spinal column at the base of the neck caused by the tip of the spine of the seventh cervical vertebra.

Deltoid landmark: a mark placed on the most lateral protrusion of the large muscle on the lateral border of the upper arm in the shoulder region.

Distal: the end of a body segment farthest from the head; opposed to proximal.

Extend: to move adjacent segments so that the angle between them is increased, as when the leg is straightened; opposed to flex.

Femur: the thigh bone.

Fibula: the slender bone on the outer side of the lower leg.

Forearm landmark: a mark placed on the medial side of the forearm 6 mm distal to the crotch of the elbow; the mark is placed when the subject's upper arm is horizontal, his elbow flexed at 90 degrees and his fist tightly clenched.

Frankfort plane: the standard horizontal plane or orientation of the head with the subject looking straight ahead.

Gluteal furrow: the furrow at the juncture of the buttock and the thigh.

Ilia: the superior broad portions of the pelvic bones.

Iliocristale: the highest point on the superior rim of the pelvic bone.

Inferior: below in relation to another structure; lower.

Inion: a bony projection of the lowest palpable point of the skull in the midsagittal plane.

Interscye: see Scye.

Knee landmark: a horizontal mark is placed midway between the upper and lower borders of the patella (kneecap).

Lateral: lying near or towards the sides of the body; opposed to medial.

Lateral malleolus: the lateral bony protrusion of the ankle.

Medial: lying near or toward the midline of the body; opposed to lateral.

Midaxillary: the center of the armpit.

Midsagittal plane: the vertical plane which divides the body into right and left halves.

Midshoulder: a point half the distance between the neck and acromiale (tip of the shoulder).

Neck landmarks: anterior, lateral and posterior marks are placed along the top edge of a loop drawn over the subject's head and tightened around the neck at the neck-shoulder juncture; the loop is adjusted so that the plane formed is perpendicular to the long axis of the neck.

Omphalion: the center point of the naval.

Patella: the knee cap.

Popliteal: pertaining to the part of the leg behind the knee.

Posterior: pertaining to the back of the body; opposed to anterior.

Proximal: the end of a body segment nearest the head; opposed to distal.

Radiale: the uppermost point on the lateral margin of the proximal end of the elbow.

Radius: the forearm bone on the thumb side of the arm.

Scrotal-perineal juncture: a point in the center of the crotch.

Scye: a tailoring term designating the armhole of a garment; scye landmarks are a series of marks drawn at the axillary folds formed by the juncture of the arms and trunk on the anterior and posterior sides of the body.

Stylion: the most distal point of the radius; wrist.

Suprasternale: the lowest point in the notch in the upper edge of the breastbone.

Trochanterion: the tip of the bony lateral protrusion of the proximal end of the femur.

Wrist landmark: see Stylion.

BIBLIOGRAPHY

McConville, John T., Milton Alexander and Seth Velsey, 1963, Anthropometric Data in Three-Dimensional Form: Development and Fabrication of USAF Height-Weight Manikins, AMRL Technical Report 63-55 (AD 411 556), Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio.

McConville, John T., 1978, "Anthropometry in Sizing and Design," Chapter VIII in: Webb Associates, Anthropometric Source Book, Vol. I, NASA Reference Publication 1024, National Aeronautics and Space Administration Scientific and Technical Information Office, Washington, D. C.

Staples, M. L., 1961, A Bibliographical Survey and Critical Review of the Role of Anthropometry in the Sizing of Clothing and Personal Equipment, GAO-373, Defense Research Board, Ottawa, Canada.

REFERENCES

Churchill, Edmund, Thomas Churchill and Paul Kikta, 1977, The AMRL Anthropometric Data Bank Library: Volumes I-V, AMRL-TR-77-1 (AD A047 314), Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio.

Emanuel, Irvin, Milton Alexander, Edmund Churchill and Bruce Truett, 1959, A Height-Weight Sizing System for Flight Clothing, WADC Technical Report 56-365 (AD 130 917), Wright Air Development Center, Wright-Patterson Air Force Base, Ohio.

Hertzberg, H.T.E., G. S. Daniels and Edmund Churchill, 1954, Anthropometry of Flying Personnel-1950, WADC Technical Report 52-321 (AD 47 953), Wright Air Development Center, Wright-Patterson Air Force Base, Ohio

Morant, G. M. and J. C. Gilson, 1945, A Report on a Survey of Body and Clothing Measurements of Royal Air Force Personnel, FPRC 633(a), RAF Institute of Aviation Medicine, Farnborough, Hants, England.

O'Brien, Ruth, Meyer A. Girstick and Eleanor P. Hunt, 1941, Body Measurements of American Boys and Girls for Garment and Pattern Construction, U. S. Department of Agriculture Miscellaneous Publication No. 366, U. S. Government Printing Office, Washington, D. C.

O'Brien, Ruth and William C. Shelton, 1941, Women's Measurements for Garment and Pattern Construction, U. S. Department of Agriculture Miscellaneous Publication No. 454, U. S. Government Printing Office, Washington, D. C.